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A WEEKLY JOURNAL OF CONSTRUCTIVE AND DECORATIVE ART.

VOL. XVI.—No. 451.] SATURDAY, AUGUST 16, 1884. [PRICE, 15 CENTS.

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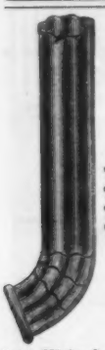

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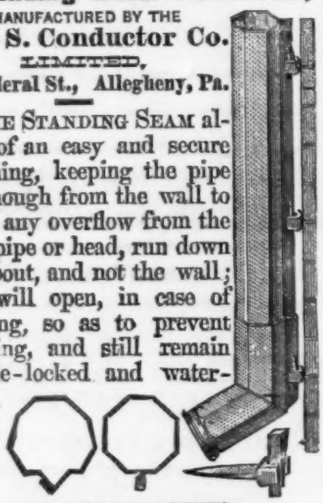

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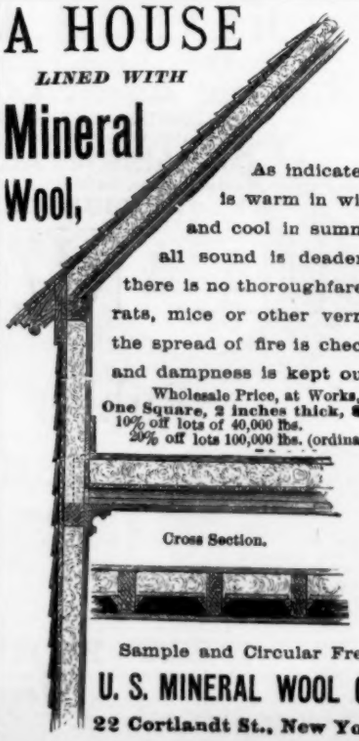

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The plastering, when applied, **clinches** on both sides of the wire, **forming a double surface.**
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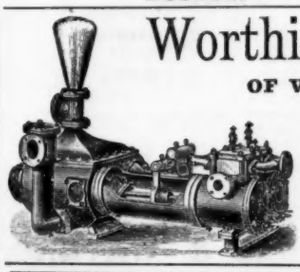
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HANOVER FIRE INSURANCE CO.

Cash Capital	$1,000,000.00
Reserve for Re-insurance	635,741.16
Reserve for all other Liabilities,	96,655.57
Net Surplus	832,744.56
Total Assets, January 1, 1883	2,565,141.39

BUILDING MATERIALS.
Reported for the American Architect and Building News.

BRICK.—₱ M.	New York. (*Wholesale Prices.*)	Boston. (*Prices to Builders and Contractors.*)	Chicago. (*Prices to Builders and Contractors.*)	Philadelphia. (*Prices to Builders and Contractors.*)
Common: *Cargo afloat.*				
Pale	$2 25 @ $3 00	Eastern 7 50 @ 8 00	Building Brick 6 50 @ 7 50	Hard 8 00 @ 8 50
Jersey	4 50 @ 5 00	Bay State Hard 9 00		Salmon 5 00 @ 6 00
Up River	5 50 @ 5 50	Domestic Com. 8 00 @ 9 00	Indiana Pressd 16 00 @ 28 00	Stretchers 11 00 @ 14 00
Haverstraw Bay	5 50 @ 6 00	Domestic Face @ 18 00	St. Louis Fronts 25 00 @ 30 00	Pressed 20 00 @ 24 00
" 1st	6 00 @ 6 25	Philadelphia 40 00 @ 45 00		
Fronts:		Phila. mould 50 00 @ 80 00		
Croton, Brown	13 @ 14 00		22 00 @ 35 00	
" dark	14 @ 15 00		65 00 @ 350 00	
" red	14 @ 15 00		50 00 @	
Chicago pressed		Glens Falls 25 00 @ 26 00		
Chicago Moulded			42 00 @	
Baltimore	37 @ 41 00		40 00 @	
Glens Falls—white	30 @ 35 00	Glens Falls Mould. 30 00 @ 35 00	25 00 @	
Philadelphia	@ 27 00		60 00 @ 100 00	
Trenton	@ 27 00		30 @	
Milwaukee			35 00 @	
Moulded:			55 00 @ 65 00	
Clark's Glens Falls—Red	25 00 @ 27 00			
" —White	30 00 @ 35 00			
White " Mold,	45 00 @ 60 00			
Enamelled: *Imp.*				
Enamelled (edge.)	85 00 @ 100 00	@	@ 100 00	Dom. @ 70
Enamelled (edge and end)	90 00 @ 115 00	@	@ 125 00	@ 85
CEMENT, LIME, etc.—(₱ *cask.*)				
Chicago Lime in bulk			65 @ 75	
Wisconsin "			80 @ 90	
Rosendale Cement	80 @ 90	@ 1 50	*Not Sold.*	1 25 @ 1 65
Utica, Akron, Buffalo, Louisville, Milwaukee	*Not sold.*	*Not sold.*	1 00 @ 1 25	*Not sold.*
Portland (English)	2 60 @ 3 10	@ 3 20	2 75 @ 3 00	2 80 @ 3 50
" (Saylor's Am.)	2 05 @ 2 40	2 50 @ 3 00	2 75 @ 3 00	2 50 @ 3 00
" (Dyckerhoff)	2 75 @ 3 15	3 00 @ 3 50	3 25 @ 3 75	3 00 @ 3 25
" (Lafarge)	3 50 @ 3 75	*Not sold.*	3 75 @ 4 25	4 50 @
" (Star)	2 70 @ 3 00	*Not sold.*	*Not sold.*	*Not sold.*
K. B. & S. (Eng.) Portland	2 85 @ 3 10		3 35 @ 3 50	3 00 @ 3 25
Burham " "	2 60 @ 2 80		3 15 @ 3 35	2 75 @ 3 00
Vorwohler	2 65 @ 3 25		3 00 @ 3 25	
German (Fewer)	2 50 @ 2 70			
" (Alsen)	2 50 @ 2 80	3 00 @ 3 50	3 15 @ 3 35	2 90 @ 3 25
Selenitic		1 65	*Not sold.*	
Hydraulic Lime of Teil	3 50 @ 4 00		*Not sold.*	
Roman	2 75 @ 3 00	@ 3 20	2 75 @ 3 25	3 25 @ 3 50
Keene's coarse	5 00 @ 6 00	@ 7 50	7 50 @ 9 00	6 50 @ 7 00
" fine	9 25 @ 10 25	@ 11 50	11 00 @ 12 50	11 50 @ 12 00
Lime:				
Rockland and Rockport, (Com.)	@ 95	@ 1 10	*Not sold.*	1 00 @ 1 25
Rockland and Rockport, finish	@ 1 15	@ 1 15	*Not sold.*	
State, com. cargo rates (nom.)	75 @ 80	*Not sold.*	*Not sold.*	*Not sold.*
State, finishing "	@ 1 00	*Not sold.*	*Not sold.*	*Not sold.*
Plaster of Paris (calcined.)	1 30 @ 1 35	1 70 @ 1 90	@ 1 75	1 60 @ 2 25
" (casting)	1 50 @ 1 65	@ 2 25	@ 2 00	2 25 @ 2 50
Hair (Cattle) ₱ *bush*	25 @ 28	25 @ 30	30 @ 35	22 @ 30
" (Goat)	32 @ 35	@ 30	35 @ 40	@
Sand, ₱ *load*	1 00 @ 1 25	@ 1 50	100 @ 1 25	75 @ 1 50
STONE. (₱ *cubic foot, rough.*)				
Granite: (*Maine*)		@ 60		
Limestone:				
Bedford	@ 1 00	95 @ 1 00	50 @	3 75 @
Joliet	@		35 @ 55	
Lemont	@		35 @ 60	
Serpentine	@		90 @ 99	

(*Continued on page vi.*)

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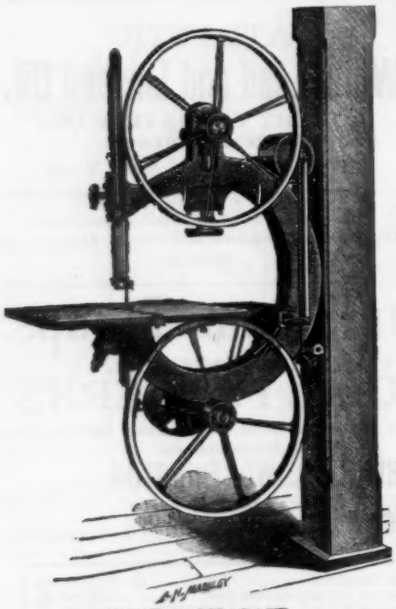

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Foundation:				
Dimension	@	5 00 ₱ ton	20 @ 28	30 @ 5 00
Block	@	4 60 ₱ perch	8 50 ₱ cord.	50 @ 6 00
Rubble	@	1 25 @ 1 50	8 50 @	
Bluestone: (₱ *sq. ft.*)				
Sidewalk	30 @ 5 00	@ 40	75 @ 1 00	70 @ 90
Planed	50 @ 6 00		50 @ 1 00	1 10 @ 1 25
Sandstone,				
Brown (Connecticut)	1 00 @	1 25 @ 1 40	1 50 ₱ cub.ft.	
Amherst	1 00 @	85 @ 95	55 @ 65	
Berea	75 @ 1 00	80 @ 90	45 @ 55	70 @ 90
Berlin	75 @ 1 00	80 @ 90	55 @ 65	
Bay of Fundy	@ 1 00	*Not sold*	*Not sold.*	
Belleville	80 @ 1 25	1 25 @ 1 35	"	
New Brunswick	@ 1 00	90 @ 1 00	"	
Caen	@	@ 2 00	"	
LUMBER.—₱ M. (*Ordinary dimensions.*)				
Boards:				
Pine, 1st quality, clear	65 00 @ 75 00	50 00 @ 53 00	47 00 @ 49 00	
" 2d quality	55 00 @ 60 00	42 00 @ 44 00	42 00 @ 47 00	
" 3d quality	18 00 @ 22 00	35 00 @ 38 00	41 00 @ 45 00	
Spruce	@ 25 00	11 00 @ 12 50	*Not sold.*	
Hemlock	ea. 17 @ 18	12 00 @ 12 50	@ 10 00	11 50 @ 15 00
Yellow pine	20 @ 40	30 00 @ 33 00	@ 28 00	16 00 @ 18 50
Clapboards:				
Pine	@	33 00 @ 55 00	14 00 @ 22 00	—@—
Spruce	@	23 00 @ 30 00	*Not sold.*	—@—
Framing Timber:				
Pine			13 00 @ 15 50	25 00 @ 35 00
Spruce	14 00 @ 18 00	13 50 @ 14 50	*Not sold.*	18 50 @ 20 00
Hemlock	12 00 @ 15 00	@	13 00 @ 19 00	12 00 @ 13 00
Yellow pine	20 00 @ 30 00	21 00 @ 25 00		22 00 @ 24 00
Laths:				
Pine	@	2 00 @ 2 25	2 25 @	—@—
Spruce	2 15 @ 2 25	2 00 @ 2 25	*Not sold.*	2 40 @ 2 60
Shingles:				
Pine, shaved	5 00 @ 6 00	@	*Not sold.*	
Pine, sawed	4 00 @ 5 60	@ 4 50	2 25 @ 2 60	
Spruce, sawed	2 50 @ 2 75	1 50 @ 4 50	*Not sold.*	
Redwood	2 10 @	@ 3 00	5 50 @ 8 00	30" $10 @ 28
Cedar, split	@	@	*Not sold.*	24" 8 @ 21
Cedar, sawed	@	2 00 @ 3 50	@ 2 30	20" 5 50 @ 14
Cypress 7 x 24	18 00 @ 20 00	5 50 @ 6 00	*Not sold.*	16 00 @ 20 00
Miscellaneous:				
Piles ₱ ft.	4½ @ 6	Piles 6c. ₱ ft.	*Not sold.*	
Fence pickets, Spruce	8 00 @ 10 00	10 00 @ 18 00	Pine, 8 @ 22	12 00 @ 14 00
Cedar posts, 9 ft. (sq. posts.)	@	25 @ 35	9 00 @ 21 00	70 @ 1 25
Chestnut "	@	25 @ 35	*Not sold.*	28 @ 36
Finishing Woods: ₱ M. *First Quality, Kiln-dried.*)				
Ash	@ 55 00	38 00 @ 48 00	35 00 @ 40 00	
Cherry	80 00 @ 120 00	60 00 @ 85 00	75 00 @ 85 00	55 00 @ 65 00
Chestnut	@ 55 00	38 00 @ 50 00	45 00 @ 50 00	60 00 @ 80 00
Butternut	40 00 @ 60 00	60 00 @ 70 00	45 00 @ 60 00	55 00 @ 65 00
Mahogany, Baywood	@180 00	100 00 @ 150 00	175 00 @ 180 00	100 00 @
" St. Domingo	@350 00	180 00 @ 250 00	250 00 @ 300 00	
Maple	45 00 @ 50 00	45 00 @ 65 00	30 00 @ 35 00	30 00 @ 50 00
Oak, red	@ 70 00	@ 50 00	35 00 @ 40 00	35 00 @ 45 00
" white	@ 70 00	@ 55 00	35 00 @ 40 00	55 00 @ 65 00
" quartered	@ 90 00	65 00 @ 70 00	50 00 @ 55 00	70 00 @ 80 00
Pine, clear	65 00 @ 70 00	30 00 @ 65 00	45 00 @ 50 00	65 00 @ 90 00
Redwood	70 00 @ 75 00	60 00 @ 70 00	60 00 @ 70 00	100 00 @
Rosewood ₱ lb	@ 6		@ 7	
Walnut, black	125 00 @150 00	85 00 @ 100 00	85 00 @ 100 00	160 00 @200 00
Whitewood	45 00 @ 50 00	40 00 @ 45 00	32 00 @ 35 00	20 00 @ 30 00
Yellow pine ₱ M	@ 45 00	40 00 @ 45 00	32 00 @ 35 00	30 00 @ 35 00
Gumwood, best red			30 00 @ 35 00	

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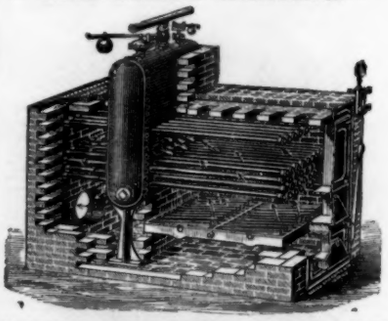

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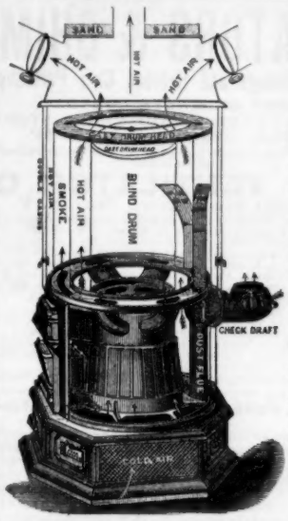

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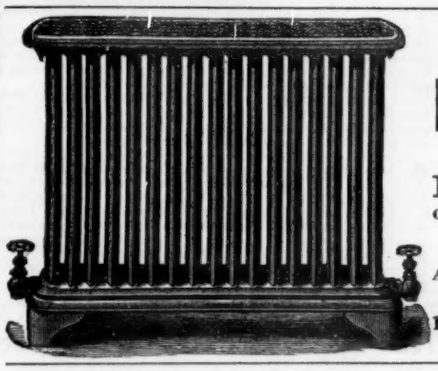

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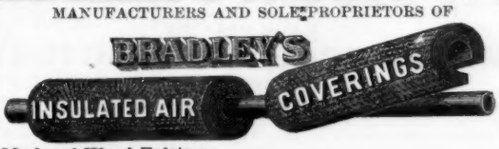

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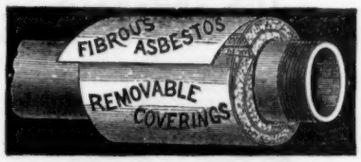

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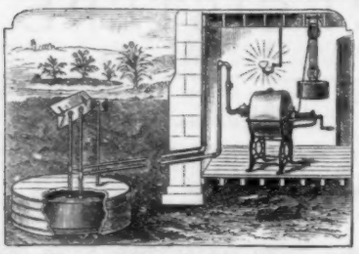

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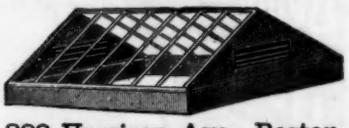

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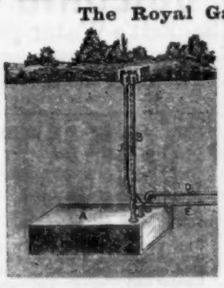

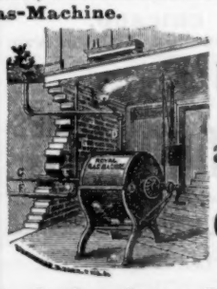

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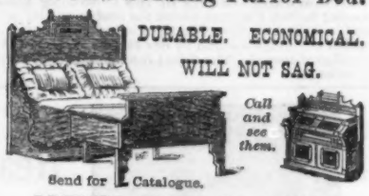

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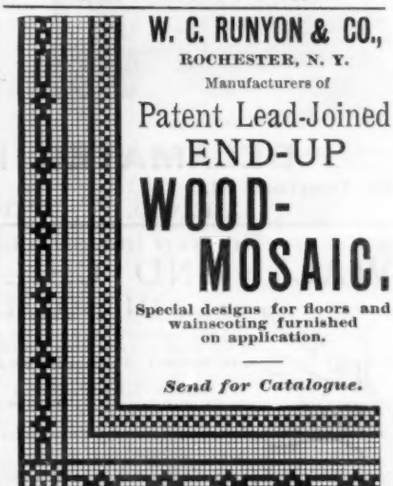

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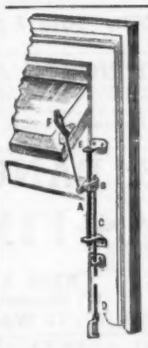

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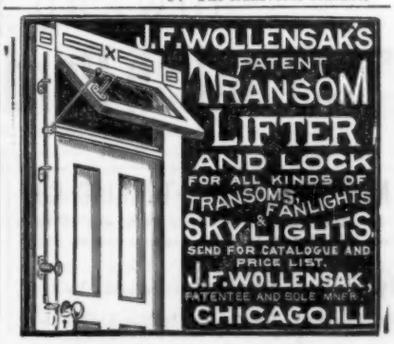

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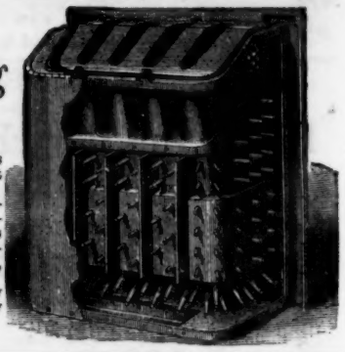

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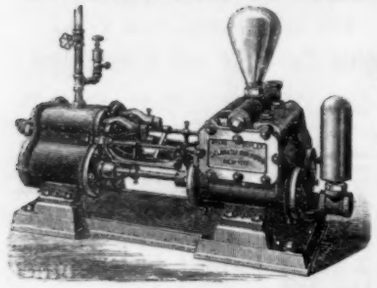

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AUGUST 16, 1884.

Entered at the Post-Office at Boston as second-class matter.

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WERE it not for two hereditary obstacles — a delicate constitution and a comfortable income — Alfred Greenough would long before this have made for himself a name high up in the list of American artist architects, and at the time of his untimely death would have been as well known by the many for his actual works as he was known to the few as a man of great promise and as seemingly great possibilities. After graduating from Harvard in 1865, and spending a year or so in travel he settled down to the serious study of architecture in Paris, entering the Ecole des Beaux-Arts as a member of the Atelier Vaudremer, where during long years he was a close and indefatigable student, regarded by students and *patron* alike as in the best sense an *homme sérieux*, and a thoroughly lovable companion. We do not believe that even to the time of his death, — which was surrounded with more than the ordinary pathos, as he died alone and absolutely unknown, stricken down by cholera at Rangoon, in British Burmah — he ceased to be a member of the Ecole or of the *atelier*, to which he always returned again after his more or less extended travels in most quarters of the globe where architecture was to be studied. A few years ago he returned to this country intending to begin the practice of his profession, but after examining the ground he thought that it would be best to return to Paris and spend a few years more in the study of scientific construction. This he did, and this seems to offer a striking instance of his strongest characteristic — a conscientious thoroughness. It was at this time that he was approached on the subject of becoming the successor of Professor Ware as the head of the architectural department of the Institute of Technology, but his physician's advice and his own mistrust of his fitness for the position forbade his entertaining the proposition. It is not a little disheartening to think that at the age of forty a man has passed away who had spent nearly half of his life in preparation for a life work that was never to begin; and it may serve as a lesson to the uninstructed public who clamor so at the fact that most architects, perhaps, seem to be only half-taught, which will show the extent and duration of the studies which a thoroughly capable but conscientious man must undertake before he considers himself worthy to begin the practice of one of the most exacting of the professions.

A NEW idea in regard to the protection of audiences in theatres from death by fire has been brought forward by M. Scheurer-Rott, who explains it in a paper read before the Industrial Society of Mulhouse, and quoted by the *Fireman's Journal*. The author of the paper carried on a long investigation into the effects of conflagrations in large closed buildings, including manufactories as well as theatres, and came to the conclusion, which is confirmed by the unanimous testimony of fire engineers, that death from fire in such places is almost always due to the smoke. The actual flames very rarely reach living beings, suffocation having generally extinguished the last vestiges of life long before the fire reaches them. In fact, according to M. Scheurer-Rott's observation, the air of large buildings under such circumstances soon becomes so densely charged with unconsumed gases that the flames dart across the space, in the same way that flashes run through the smoke of a freshly-kindled fire in a fireplace, and ignite in an instant portions of the interior which may be far away from the principal centre of combustion. As a remedy for this, the essayist proposes that openings shall be made in the ceilings of public buildings, closed with valves which can be operated from the outside, and large enough to allow the smoke and heated air from a considerable conflagration to escape. If such vents were provided, he believes that the smoke would pass out through them, leaving the corridors, in which the greatest slaughter now generally takes place, nearly free from the suffocating clouds which are under the present plan soon forced into them. It is true that in one sense these vents would encourage the fire, but they would at the same time, by keeping the surrounding atmosphere clear, enable the firemen to reach the flames with much more precision and effect, while there would, with them, be nothing to fear from the opening of doors or windows by a rescuing party, which, in closed buildings filled with hot smoke, often serves to spread the flames in all directions by the effect of the new supply of oxygen so given.

WE are not a little indignant at the tone of personal hostility which the *Sanitary Engineer* adopts in commenting on the report of Messrs. Putnam and Rice, made to the Boston Board of Health on their experiments on the siphonage of traps, which was published in our issue for June 7. Amongst other things Mr. Putnam is inferentially held up to scorn because Messrs. Philbrick and Bowditch, who were to make the experiments with him, withdrew their co-operation after having assisted at some of the tests, and declined to sign the report, so that these tests had to be repeated with the assistance of Mr. Rice. It seems to us that Messrs. Philbrick and Bowditch made a mistake in withdrawing their assistance. If they were really convinced that Mr. Putnam's experiments did not — as they seemingly did — prove that their conclusions from their own experiments for the National Board of Health were in some degree in error, it seems to us it was their plain duty to follow the usual custom of committees who cannot agree, that is, to submit a majority and a minority report, a course which would have had obvious advantages for them, as theirs would have been the majority report. It seems to us, too, that an editor who had taken an even two months for his investigation should have found time to investigate both sides of a matter which he is apparently willing to make turn on a question of personal veracity. Apparently the *Sanitary Engineer* has "interviewed" everybody except the person who could give the most complete account of all transactions — Mr. Putnam. The inference plainly is, that for some reason — which is not far to seek — the *Sanitary Engineer* had made up its mind to discredit, so far as it could, the results obtained by Mr. Putnam, a thing which, if it could be done at all, should have been done by a logical and scientific analysis of the methods and arrangements employed, and not by maligning Mr. Putnam's private character. We cannot believe that Mr. Philbrick would have allowed a transcript to be made of one of his private letters had he suspected the pettifogging use to which it was to be put. We do not wish to be understood as endorsing the accuracy of Mr. Putnam's conclusions; the experiments and the reasoning which led to the deductions incorporated in the report have been detailed in these columns with unusual particularity, and we believe our readers generally are competent to form their own conclusions. Mr. Putnam's private character certainly needs no endorsement at our hands, and we shall leave him to protect it and his experiments in the columns of the paper which has attacked him, which we will assume are not closed against him as a social and sanitary pariah.

AS to the criticisms which the *Sanitary Engineer* applies after unjustly aspersing Mr. Putnam's personal character, the accusation that the apparatus employed in the tests was not a "fair type of ordinary good practice" can be gauged by those who can agree as to what is "good practice" — in this lies the quibble. It is the old tale of disagreeing doctors: on one side stand Philbrick, Bowditch and the *Sanitary Engineer*, on

the other Putnam and Waring. When the *Sanitary Engineer* asks us to believe that the arrangement used is not such as is frequently met with in practice — good, bad or indifferent — it asks too much, as any one knows who is called upon to examine or alter existing systems of plumbing. Its argument that Mr. Putnam had no right to use a closet discharging four and one-half gallons of water is particularly cool, seeing that the closet used is one which has, perhaps, the largest sale of any in the market. The point on which is laid most stress is the employment of a 4″ x 4″ Y-joint instead of a 4″ x 2″ for the experiments on siphonage, it being asserted that the existence of the four-inch branch of the Y caused a suction four times as great as if the branch had been a two-inch one, and in support of this assumption is used the following remarkable statement: "This sort of action [suction] is certainly just in proportion to the size of the side opening in the vertical pipe." It seems to us that the "size of the opening in the vertical pipe" has only to be enlarged indefinitely to reduce this statement to a *reductio ad absurdum*. All that is said about the fall of water from the water-closet forming "a solid piston seven feet in length," which has an unfair effect on a branch forty feet below, is beside the mark, for, even if such an unnatural thing as a "solid" piston of water could exist after a fall of forty feet, as a matter of fact the fall was only eleven feet. We only point out a few of the blunders that occur in this three-column attack to show that those who read it should understand that it is not only "biased," but also inaccurate and illogical.

MR. LAWRENCE HARVEY, a lively young English architect, writes to *La Semaine des Constructeurs* an account of a visit to the Health Exhibition at London. Mr. Harvey does not pretend to be an enthusiast in such matters, but he describes very clearly what he saw, and the account is as interesting to us as to the readers for whom he intended it. A very effective device for illustrating the difference between good and bad house-drainage is shown at the Exhibition in the shape of two model-houses, one fitted up with the plumbing of twenty years ago, and the other with the best work of the present day, according to English ideas. The former is fitted with a bath and water-closet, both supplied from a cistern in the top of the building. The supply-pipe to the bowl of the closet is controlled by a valve in the cistern, and of course stands constantly full of air diffused from the closet-bowl, except when the handle is pulled, when the descending water displaces the air upward, to be absorbed by the contents of the cistern. The water-closet is of the pan type, and is placed in the interior of the house, and drains through a D-trap, into which the waste from the bath enters, on the sewer side of the trap, so that the drain ventilates itself freely through the bath overflow. The soil-pipe ends at the closet, so that even if the trap is not siphoned out, any irregularity of pressure in the sewer would force bubbles of gas into the house.

IN the second house, which is intended to show the work as it ought to be, the plumbing is ventilated in a manner which would startle a New York or Boston architect. It is hardly necessary to say that the soil-pipe is carried above the roof, and those who know something of English plumbing will not be surprised to hear that the soil-pipe is wholly outside the house; but besides the exterior soil-pipe, the house wall is adorned with a general basin and bath waste-pipe, in sections, each a story high, and ending at the top with a hopper mouth, over which empty separate waste-pipes from each bath and basin, besides overflows and safe wastes from these and from the cisterns. All these pipes have independent mouths outside the wall, a single basin, bath and water-closet thus requiring eleven pipes passing through the wall, besides the two main vertical pipes. In Mr. Harvey's sketch none of the pipes are trapped except the waste from the water-closet, but we presume the traps are inadvertently omitted in the drawing, since, as we know by personal experience, an untrapped waste-pipe emptying over a disconnecting hopper serves to carry the odors exhaling from the hopper back into the house in a way which no trained American nose would tolerate. To say nothing of the exposure of the whole system to freezing, which would effectually prevent its adoption in any climate colder than that of England, one cannot help thinking that the multitude of little orifices in the wall, each diffusing the exhalations from three or four feet, at least, of slime-lined overflow or waste pipe, must give anything but a pleasant character to the air of that side of the house.

THE Paris Congress of Architects seems to have been conducted in much the same way, and with much the same good feeling, as the Conventions of our own Institute. According to the report in *La Semaine des Constructeurs*, the last day of the Congress was spent in the pleasantest duties. The principal business of the day was the presentation of medals and other honors to persons distinguished during the past year in professional work, silver medals having been awarded to pupils in the School of Fine Arts, the School of Decorative Art, the City Apprentices' School and the private architectural school, besides a bronze medal to M. René de la Blanchère, a Grand Prize Student at Rome, and silver and bronze medals to various workmen of special skill in masonry, stone-cutting, carpentry, painting and other trades. Perhaps the most interesting award was that of three silver medals, paid for out of the Lesoufaché foundation, established ten years ago, for examples of domestic architecture of special excellence; the three recipients for this year being MM. Sanson and Magne of Paris, and M. Delaistre of Villers-sur-Mer. After conferring these distinctions, the members of the Congress dined together at the Hôtel Continental, now a very popular place for such affairs. One hundred and forty gentlemen participated in the dinner, and the amiable feeling which prevailed seems to have been well expressed by a member from Bordeaux, who regretted sincerely that he had never been present before. Among the pleasant speeches one is to be noticed, which was made by M. Bertrand, President of the Association of Master-Builders of the Department of the Seine, offering to the Congress, in the name of those whom he represented, the warm sentiments of regard which the contractors feel toward the architects "who show them the path of science and duty."

THE *Hydraulic and Sanitary Plumber* quotes, apparently from a letter, the excellent suggestion that in places where plumbers are required to obtain a license before practising their trade, as is now the case in most of our large cities, the applicant for the license should be obliged to pass an examination on the principles of plumbing and drainage work before receiving it. The writer of the letter complains, with reason, that men are constantly deserting other kinds of business to take up that of plumbing, without any knowledge whatever of the latter beyond a silly notion that it is profitable; and being alike ignorant of the proper method and necessary cost of doing good work, these new-made sanitarians secure contracts by bidding for them at random, and of course try to save their pockets afterwards by devices which frequently involve sickness and death to their patrons. Architects will sympathize sincerely with the good plumbers in their desire to keep such ignorant meddlers out of the trade, for there are few of them who have not experienced the anxiety and disgust which accompany the attempt to supervise the work of a cheap plumber. Especially with houses in the country, where the local tinman is apt, not only to profess the art of plumbing, but to make himself disagreeable to those residents who hesitate to commit the health of their families to his skill, the architect is often obliged, in deference to the representations of his client, to try to make the best of the work of men who not only put in traps upside down, and lay drains with dry joints, but hate and despise all who think there is any better way of doing such things. We do not say that all, or even most country plumbers are of this kind; on the contrary, the very best plumber we ever knew carried on his modest business in a small seashore town, and there are many like him in similar places; but the botchers and bunglers are far too common in the rural districts, and careful architects cannot help preferring to give their country work to city men, who at least have had the advantage of practice under municipal regulations, rather than trust to such skill as they have learned to look for in smaller places.

THE *Builder* in a notice of the International Forestry Exhibition now open in Edinburgh, mentions that much attention has recently been paid to the care and extension of the forests of South Africa. Timber is rare in the southern parts of Africa, and at the Cape of Good Hope only a small strip, twenty miles wide by one hundred miles long, remains out of the vast primeval forests. This strip is now carefully guarded, to prevent fires, and to see that the cutting of timber is carried on judiciously, while, under the care of the Government, nurseries have been established, from which vacant places in the forest are filled, while stock is also sold to private planters.

THE DRAINAGE OF THE VILLARD HOUSE IN NEW YORK.

ANTIQUE HEAD OF LION

THE illustrations published in connection herewith are reproductions of the record drawings accompanying the description of the work supplied to the owner for future reference.

The plumbing was executed by the Drainage Construction Company of Newport and Boston, under my own direction, and under the immediate control of Mr. S. P. Poland, an assistant engineer of the Company.

The house stands on the north-east corner of Madison Avenue and Fiftieth Street, and covers about 60′ x 100′. The street on which its longest side faces has a sewer of sufficient depth and capacity for all requirements.

Under the New York law the plans and specifications for the work had to be passed upon by the Board of Health. They were submitted with adequate explanations. They were rejected for several reasons, as follows: —

1. There was no back-ventilation of traps as required by the New York law.

2. Some of the four-inch soil-pipes recommended were rejected because of the number of bath-rooms connected with them. The four-inch horizontal pipes under the ceiling of the cellar were rejected because of their connection with rain-water leaders.

3. The "Dececo" water-closet prescribed to be used was rejected as being "a very complicated piece of earthenware."

4. The "Weaver waste" prescribed for wash-basins was rejected because of its liability to favor the deposit of solid matters in the branch below the bowl.

On consultation the following results were reached as to these objections: —

1. The back-ventilation of traps was insisted upon by the Board of Health, and was necessarily accepted by the engineer, but accepted under protest, and with the statement that in his judgment it would be better that the proprietor should pay the large cost of this part of the work for the privilege of omitting it rather than for its execution, and for these reasons: —

(*a*) The free circulation of air in the immediate vicinity of the sealing water would, unless constant attention were given, ensure the unsealing of all the traps during any considerable period when the house might not be occupied.

(*b*) Aside from the cost of the extra work, the additional introduction of such a great length of pipe, some of it of lead and some of it of iron, with its many joints and its liability to accidental injury, would add a serious element of danger to the system, the belief being that the waste-piping connected with the drainage system should always be restricted to the least possible amount.

(*c*) Experience had sufficiently shown that long and intricate air-channels are often ineffective in preventing the siphonage of traps, while the choking of the lower end of the vent-pipe, by an accumulation of foul matters dashed into it by frequent discharges of foul water, much more frequently renders it inoperative — by entire closure, or by such a restriction of area as to prevent the sufficiently free movement of air; it was thought that such causes would at times operate to render nugatory the apparent means of safety.

(*d*) Aside from its inefficiency, its dangers and its cost, it seemed impolitic to apply the ventilation system in this house, where every vessel, with the exception of the water-closets, was to be trapped with a mechanical trap of positive action, and while the water-closets themselves would have traps of such volume, and so exposed to view that not only would their unsealing by siphonage be impossible, but their exact condition would always be obvious.

2. It was equally unavailing to protest against the larger soil-pipe required, and a diameter of five inches was accepted perforce, — but with a protest based on the fact that no roof of the size of the one here to be provided for could deliver its water into the upper ends of its numerous leaders so rapidly that the four-inch pipes intended for its ultimate discharge into the main drain would not be more than doubly sufficient for its removal; also, with reference to the number of fixtures connected with each soil-pipe, it was maintained that even though every water-closet and every bath-tub on each stack should be discharged at the same moment, the whole flow would not nearly equal the capacity of the pipe. It was represented also that the flow of water through the soil-pipe — the most effective flush coming from the use of the water-closet — would be relatively stronger and more cleansing in a four-inch pipe than in a five-inch pipe.

3. This objection was withdrawn on demonstration that so far from being complicated the "Dececo" water-closet is as simple as a plain funnel with a bent exit-pipe can be.

4. This objection was withdrawn on demonstration that, while it is true that the lateral chamber of the "Weaver waste" is subject to a slight encroachment of foul matters, it is not so much so as is the lateral pipe of the "Boston waste," the use of which is permitted by the regulations of the Board of Health, and that this channel is entirely shut off from the air of the house — while that of the "Boston waste" is not. It was shown also that while the chain and plug, also permitted, is extremely untidy, there being an inevitable fouling of the links of the chain and its attachment to the plug, the "Weaver waste" affords a perfectly smooth interior to the bowl, which is kept clean without extra attention.

These points having been settled, and the character of the workmanship having been found acceptable there was no further interference from the authorities.

DESCRIPTION.

The main outlet for all of the drainage is on the south side of the house and into the street sewer, at a point below the floor of the cellar.

Before the work was taken in hand by the Company there had been laid around nearly the whole of the cellar, below the level of the concrete and generally near to the foundation walls, a brick drain which was not disturbed. Later, a tile drain was laid running under the centre of the cellar connected with this brick drain. These drains are now covered under the concrete flooring, and are connected, by a valved and constantly submerged trap, with the main outlet pipe of the foul-drainage and rain-water system. Connected with them is an iron drain leading from an area on the north side of the house.

The arrangement of these drains, and also of the Croton supply-pipes, which are under the basement floor, is shown in Figure 1, which gives the cellar-plan of the house.

Figure 2 is an elevation showing the arrangement of various pipes centering at this point of outlet, and supported mainly against the outer wall of the house. In this illustration, as in the others given, the various systems are represented as follows: —

Foul-drainage, rain-water, and fresh-air inlet pipes by solid buff color.

Vent-pipes for the ventilation of traps against siphonage by cross-shading.

Cold-water supply-pipes, whether from the tank or from the Croton pipes, by blue.

Hot-water supply and circulation pipes by red.

Drip-pipes from the safes under wash-basins, baths, etc., by green.

The circular section at the bottom of the illustration is a section of the main eight-inch outlet-pipe leading to the street sewer.[1] The branch to the right, above the trap, is a fresh-air inlet opening into the area outside of the house. The smaller branch to the right receives the waste of the scullery-sink to the right, and of the kitchen-sink to the left. The first branch to the left receives the waste of a water-closet in the cellar, and of a sink in the cellar which is connected with the water-closet branch. The next branch to the left is a rain leader which, from a point above the basement floor, is carried inside the wall of the house. The vertical pipe over the trap turns at a point below the cellar ceiling to receive the horizontal runs connecting the other soil-pipes and rain-water leaders of the house, with the main outlet, as shown in Figure 3.

The two sinks shown in the basement (Fig. 2) are provided with "Dececo" flush-pots, which are closed at the bottom with plugs attached to a spindle rising through a large strainer in the floor of the sink. There is no discharge from these flush-pots, except while the plug is held up. Ordinarily the outlet is closed, and the waste from the sink accumulates until it appears above the strainer. When the plug is raised the whole contents, six or seven gallons, are discharged with great rapidity through the waste-pipe, preventing the accumulation of grease, which is sure to result from a trickling stream. The strainer and plug can be entirely removed at pleasure for the cleansing of the interior of the flush-pot. These flush-pots are of iron. That under the copper sink of the butler's pantry is of tinned copper — nickel-plated on the outside. All of the flush-pots are exposed to view; no casing.

Under the second floor is shown the weir of the "Dececo" closet with the other attachments of fixtures of the bath-room with the waste, ventilation, supply and drip pipes.

Figure 4 shows the area drain running under the house, and the location of the horizontal run across it with its different branches as indicated in Figure 3.

Figure 5 shows an elevation of the soil-pipe connected with a series of bath-rooms on the second, third and fourth floors; also the openings into the same for the drainage of other fixtures, and for the back-venting of other traps than those of the "Dececo" closets.

This soil-pipe is five inches in diameter, as far as a point in the attic where it is increased to eight inches — this increase in size, securing a better movement of air through the pipes, being carried out on each of the lines.

The connections with the fixtures of this line on the second floor are shown in Figure 6, and the arrangement of the fixtures themselves in Figure 7. The connections with this line on the third floor are shown in Figure 8, and those on the fourth floor in Figure 9.

In like manner the connections of all of the fixtures in different parts of the house with the different supply, waste, drip and vent

[1] This pipe was laid before I took charge of the work. It is large enough for a small village.

pipes are shown in similar drawings which give the exact size, location, character and connection of the whole system.

The difficulty of arranging and of accommodating to each other these various pipes is especially illustrated by Figures 10 and 11. Incidentally they illustrate the tortuous course necessarily followed, where work must be laid under the floor or behind the plastering of walls, by the vent-pipes required by modern Board-of-Health regulations. This is a serious matter in view of the fact that every bend in an air-pipe, through which a sudden movement is to be depended on for the protection of traps, is an added obstruction to its flow.

The numbers on the different faucets of the supply-pipes correspond with a record table indicating the point at which each supply may be cut off at pleasure.

In constructing the work every soil-pipe, vent-pipe and leader was tested by having its outlets closed, and by being filled with water, every joint being recalked as often as necessary to insure absolute tightness. It is believed that in no portion of the whole system is there the least possibility of any communication through leaky joints or otherwise between the interior of the drainage system and atmosphere of any part of the house.

The whole work is of the most simple arrangement compatible with such a general distribution of bath-rooms and other points where water is drawn or discharged on the different floors.

The baths are of porcelain (English), *with their inlets and outlets rearranged*, so as to avoid on the one hand the foul overflow for which they were originally constructed, and on the other the liability of a back-suction of the contents of the bath in the event that, its supply-pipe being open, water might be drawn from a fixture below it in sufficient volume to reverse the flow. For the overflows and waste-plugs there have been substituted in all cases simple stand-pipe overflows inserted in the outlets. Water is supplied through stationary cocks overhanging the foot of the tub.

The wash-basins are supplied through compression-cocks. The wastes are all closed with the Weaver device, which leaves the interior of the bowl entirely smooth, with no point for the accumulation of slime, and the traps are in all cases Cudell traps, closed with balls of tested accuracy of fit. The space under each wash-stand is entirely open, and is finished to the height of the marble slab with glazed tiles. The supply and waste pipes and the traps are nickel-plated.

The water-closets, thirteen in number, are all "Dececo" closets supplied with separate flushing-cisterns operated by pendent chains. The space under the seat is entirely open to sight and ventilation, the floors and walls being covered with tiles. These closets are arranged to be used as urinals or as slop-hoppers, the seats being hinged to turn back out of the way. In the whole house there is only one "slop-sink" — on the floor containing the servants' bedrooms.

The wood-work in the bath-rooms is of the simplest description, and of the least possible amount, the floors being generally of *terrazzo* work, and the walls of the rooms of tiles or of marble.

The public water-supply being unreliable for the upper floors the entire system of supply-pipes is connected with duplicate tanks, each of 1,500 gallons capacity in the attic. In addition to the ordinary tell-tales these tanks are supplied with electric tell-tales, registering near the steam-pump in the cellar, which indicates when each tank is nearly full or nearly empty. The tanks are entirely independent of each other, and may be worked separately or together at pleasure. Each has an independent overflow to the roof gutter, and each is covered by a light wooden frame over which muslin is stretched, affording sufficient ventilation, but excluding dust and insects.

My aim in this work has been to secure the fullest measure of convenience, with great simplicity, and absolute security and durability. For its "elegance" it depends on the highest finish, and the entire absence of ornamental work. I believe it to be free from sanitary defect. For the reason above given I should have preferred to omit the "ventilation" of the traps, but, as the work has been done, I think this weak point has been sufficiently guarded.

George E. Waring, Jr.

DRAIN-TESTING.[1]

Some years since a letter appeared in a contemporary, drawing attention to the importance of house-draining being free from leakage, and advising every one who had a drain in their house to procure a certain quantity of ether, and pour it down a sink or closet, and then, if any defect existed, the ether would escape, and the defect be discovered. This amateur system of drain-testing took immensely with the public, and, I dare say, there was a run upon the ether market for a time, and even now I meet with people who have just tested with ether. The letter did good, for it taught the public that it was important that their house-drains should be sound and free from leakage. There are in England and Wales about 4,000,000 houses, and I should not be astonished that, if these were tested, at least 3,000,000 would be found defective.

Drain-testing by strong scents is not a new thing. for in my early days (nigh fifty years ago), I have a vivid recollection that if water in which cabbage had been boiled was discharged into the kitchen sink, its odor invariably escaped into the cellar, up the staircase, and, I dare say, the air of the reception-rooms and bedrooms did not escape being highly charged with this vegetable test; but then in those days everybody considered it the right thing, if able, to have drains under their houses. As a matter of course, such drains must emit a bad odor, or how should a stranger be able to discover the locality of that useful appendage to a house — the water-closet. "Follow your nose," was the order of the day, and your nose seldom played you false. In these later days we are more alive to defects in drains, and drain-testing has become quite a business, and consequently we all have our fads in this direction; one is strong for chemicals, another for smoke, another for filling with water, and another trusts to the sense of smell to detect the natural drain odor, and the latter class of testers are legion, and they are generally of "opinion strong," for, say they, if you cannot detect any drain odor, the drains must be perfect. As I have for many years practised in each and every of these testings, I will give my experience, and in doing so I trust that I shall throw some light upon the question of drain-testing, for I find that some of those who ought to know are not all so well informed as they should be.

I take rather a broad view of this drain-testing, for I do not believe that either of the systems enumerated above are applicable in all cases. Take, for instance, the case of an old house; you want to know if the drains are free from leakage, and your client will not hear of breaking ground, as he feels sure all is right, for he has constantly had traps put in. Now these traps are the rub. There is a trap at the closet, and at the foot of the soil-pipe; another at the end of the passage, another under the cellar, another just out of the house, and another close to the common sewer or cesspool. So here we have the drain divided into six sections or pockets, and it is found that water passes freely from the water-closet to the cesspool, for you can hear it enter that receptacle by applying your ear to the bung-hole of the man-hole stone, or cesspool ventilator. To apply a smoke test in a case like this would be absurd, for the most you could do would be to try one or two sections through a sink or bung-hole, but if you put carefully a strong peppermint oil, ether, aniseseed oil or nitro-benzole, and plenty of hot water to follow, the chances are you may fairly test the drain from end to end, and may find, if this test has been effective, by applying your nose to the bung-hole or ventilating-pipe, and so discover if the test has gone from end to end. The advantage of the chemical test in such a case as I have described is that no trap in the line of the drain will interfere with its free action, for wherever the drainage flows the test will also flow, leaving particles upon the sides of the drain; so you have a long line of scent from closet to cesspool, and, if proper precautions are taken, you will be able to discover about the locality of the fault, if any.

If we have laid down new drains, and know where the traps are, there is no better test than smoke by the fan, and the machine made by Messrs. John Watts & Co., engineers, of Bristol (who also supply test-paper), I believe to be the best in the market; at any rate I find it handy and effective, and, if packed in a box, is not a heavy package to travel with.

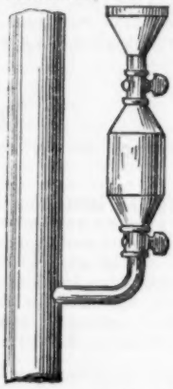
Water-testing has its limits, for seldom will a system of drains stand water pressure. Take a case: a small house has a 6-inch drain from back to front, is trapped at the sewer, has a scullery and a yard-sink. The trap and sinks are plugged securely, and you let on the first floor water-closet service-pipe, until the basin is nearly full; all at once the water sinks, for something has given way; probably an underground pipe burst. You inquire into this, and find that the drains have been submitted to a pressure of about 12 lbs. per square inch. This upon the 6-inch pipe is more than 200 lbs. per inch run. To my mind this is a pressure that no drain should be submitted to, for drains are not made to carry high pressure water. It may be said that should a stoppage take place in the underground drain, everything should be strong enough to resist the water rising in the soil-pipe; but this can seldom, if ever, take place, for an escape at the scullery or yard-sink would at once draw attention to the stoppage. Water-testing is very well for a ware drain that has three or four feet rise, but nothing above that height should be filled with water, except the drain is of iron. There is this advantage in a water-test — you fill the pipes and watch the effect; if it falls but slightly it shows that there is a leak somewhere; if they are tested before being covered up you can detect the spot; but if the drain is covered the whole must be opened and examined, for the leaking water will travel under the pipes for many yards, and possibly be absorbed by the soil. Water-testing should only be tried upon new open drains, and after the cement-jointing is well set. Some consider that a soil-pipe is best tested by water — if the pipes are strong, well and good; but I have a lively recollection of a lead soil-pipe being so tested, and the lower end of the pipe gradually assuming a leek-like shape. In drain-testing by water it is well to be provided with turned plugs of several sizes, about three inches long, covered with India-rubber. Some prefer leather cups, with plugs of cork inside them.

Upon applying the smoke-test it is necessary to take some precautions. All outlets (such as air-openings) should be plugged, and also the outlet of the drain should be cut off; for I have known cases

[1] A paper by **Henry Masters** in the *Sanitary Record*.

when a strong current set in the direction of the main sewer, in which circumstances, the smoke would be found to pass from the house instead of to it. You must also regulate the quantity of smoky material according to the capacity of the drains and pipes to be tested, for a mansion will require more smoke than a cottage; and if you can cut a small hole into the drain at several places, and cork all but one up, an examination of cork after cork will assure you that smoke is present at certain points, and disclose if the drain-pipes have been laid without pockets or accidental cesspools, caused by the pipe-layer allowing the pipe here and there to sink. In some cases you will find a difficulty in getting at the pipe to make a hole into it. In such cases attack a gully or trap outside the house, or even the kitchen-sink, extract all the water from the trap with a sponge, and insert the smoke-pipe, bound round with a duster or house-cloth, or a flexible tube may be passed through the trap water, and the water in the tube expelled by your breath. The great advantage of smoke-testing is that you can see, as well as smell, the exact locality of the leak, or at any rate you can follow the smoke to the defective parts, for it is of a strong flavor, flavoring the earth round a defect. In some cases I have known it leave a sort of tint upon the earth. With the smoke-test you do not require to be so careful of handling the apparatus as in chemicals, for touching a peppermint cork will scent your fingers or dress, and will occasionally give a false scent; therefore too much care cannot be taken in chemical-testing.

The sketch herewith shows a suitable bag for carrying your chemical apparatus; it is in two parts, the upper a Gladstone or other approved leather receptacle, and should contain a set of tools, viz.: a square-faced and pointed-backed geological hammer, useful for cutting a small hole in a ware-pipe, and also as a centre punch; an American drill, to make 3-16th inch holes in iron pipes; a square reamer; a screw-tap, such as used by gas-fitters; a curved pipe, with taper screwed ends, for fixing into a soil-pipe; several receptacles for chemicals, which may be screwed upon the curved-pipe. These receptacles have taps bottom and top, and the contents are discharged into the pipe by opening the under tap first, and the upper afterwards, and the chemical will pass down by gravitation; but it may be advisable occasionally to screw a funnel on the upper end, so as to run some water through from a jug. This test is better applied out of doors, if possible, for it is next to impossible not to allow a small escape. Some lead or gutta-percha plugs, to screw into the pipe holes after you have finished; a screw-driver; a light hard chisel; a taper-piercer, to make holes in lead pipes; some nails, string, and wax tapers; some slips of brown paper, which have been soaked in vinegar and saltpetre, for simple smoke-testing, such as waste-pipes, etc. There should also be some tin divisions, to contain two stoppered bottles, having a tablespoonful of diluted sulphuric acid in each, and about six "torpedoes," each charged with two ounces of oil of peppermint.



The lower part of the bag is a box, having a cover well screwed and jointed with rubber, so that no scent can escape. This box should not be taken inside the house, and it should be fitted inside with tin divisions, to receive, say, two stoppered bottles, each to contain ¼ pound of ether; two bottles, each to contain two ounces Hotchkiss's oil of peppermint, two bottles, each to contain ½ lb. of oil of murbane (artificial almonds); a duster or two, and practice will perhaps suggest other tools, apparatus, and tests. With such a bag, fitted, you can commence operations; and first I should advise you to make an inspection of the whole premises, and take a rough sketch of the basement floor, noting by an **X** every sink, by a ● every soil or waste-pipe, by **O** every rain-water pipe, and by dotted lines the supposed position of drains, underground tanks, bench-marks, cesspools, etc., and the more notes you take the better. Examine all upstairs apartments, making separate sketches of closets, bath-rooms, and lavatories, with notes of fittings, water-supply pipes, overflows, etc. You will be now in a position to commence testing, as you will have a fair knowledge of the scheme of drainage. At the same time, if you can get a local mason and plumber who have had something to do with the drains, they can give you much out-of-sight information which you will find valuable. Having studied the various directions of the drains and pipes, endeavor to inject into each section a test of different odor; but, before commencing, all doors and windows must be closed, air-pipes and main drains stopped. Give your assistant full instructions, and keep him outside the house. He should be provided with the chemical box, several buckets of hot water, and a jug. Your position is inside the house, having previously provided yourself with what you require. Your assistant will drill the outside soil-pipe, or see that an outside sink is clear, and inject a test, which he washes down with hot water. If the test should be put in an outside soil-pipe you can assist its development by pouring some hot water into the inside closet. Your next duty will be to enter each apartment, commencing near to where the test is applied, carefully closing each door after you; and if any test is discovered escaping, endeavor to find its exact point of escape, and make a note. You may find it necessary to try inside soil-pipes, because there may be traps top and bottom, and this may be done by putting down the closet a "torpedo," suspended by about a yard of string.

To describe the mode of testing in every case would far exceed the limit of this paper, but like everything else, to be successful requires experience and a large amount of ingenuity, for the difficulties are many, and not least is having inaccurate smelling powers; and it is astonishing how defective the sense of smell is with some people. I have met with individuals who have failed to detect any scent even from oil of peppermint dropped into a glass of hot water, and again others who have scented out one's test-bag as it was taken through the house. A successful tester must, therefore, cultivate this important sense, so as to be able to distinguish the difference between one scent or another, and it is well to procure the use of an inmate's nose also, as it confirms your own opinion, and is evidence. A perfumer can tell to a nicety the kind of scent contained in a bottle or cake of soap, and their proportions, and I see no reason why drain-testers should not be able to distinguish the scent escaping into the house that his assistant has injected into the drain outside.

Another important matter in drain-testing is temperature. If the house to be tested be occupied, and plenty of fires going, and the outside air at freezing point, the probability is that your testing will be very successful; on the other hand, should your test be applied to an empty house, and the outside temperature warm, very leaky drains may not be detected; in the latter case it is better to put off your testing till a more suitable day.

For chemical-testing, Hotchkiss's oil of peppermint stands first on the list — dose, from one to two ounces — and it can be detected in the drain for twenty-four hours after it has been applied; next, sulphurated ether — dose, four to six ounces — this passes off in about four hours, and care should be taken not to allow a light to come near the ether, or for it to accumulate in pockets.

I tested the drain of one house with ether, and a fortnight afterwards a workman opened a cesspool into which the test had found its way, and upon striking a light to examine the cesspool, he was blown about three feet into the air, and had some slight burns; and a lady client once informed me that she had tested her own drains at night, by pouring into an outside sink a bottle of ether; the result was that she was thrown some distance from the seat of operation, and her servant who had the candle, ran for her life, and some light wood-work near took fire.

Nitro-benzole is a powerful test and retains its smell about as long as peppermint; it has a strong almond scent — dose, six ounces. Oil of aniseseed is about the same character as murbane, but it cannot be successfully used in cold weather, There are other tests, such as oil of thyme and eucalyptus; but I find the above are sufficient for my practice.

In chemical-testing great care must be taken not to be deceived by a false scent. If your assistant passes through the house after opening a test-bottle he may leave a trail behind him, which may be mistaken for an escape from the drain. A lady amateur informed me that she had tested her drains, and found them in a dreadful state. She poured a bottle of peppermint into an inside water-closet, and she traced the scent up her staircase, and into every room of the house. The test of course passed through the closet door into the warmer atmosphere of the house, and so deceived her. A test properly applied in this case discovered no defect whatever.

In the upper bag I have suggested bottles with a little sulphuric acid in them. These are for taking samples of water from the pump, tap, or underground rain-water tank: and although I do not advise the readers of this paper to turn amateur chemists, I think they should have sufficient knowledge to be able to tell the difference between good or bad water, or to test in a simple manner the water they may find in use in a house they are called upon to inspect. If you get a sample of fairly good water, and put it into a test-tube with a drop of permanganate of potash, it will color it a very light pink, and it should retain this color for a day at least; but if you treat a sample of foul water in a similar manner it will immediately assume a yellowish color, showing that it is not pure; and if such water as this be found in a house, the sooner an analytical chemist's opinion upon it is taken the better.

STROLLS ABOUT MEXICO. — III.

WE took the train for a day's trip to Amecameca at eight o'clock on a keen-aired and sunny February morning. Amecameca lies close at the feet of the two great mountains, Popocatepetl and Ixtaccihuatl, and is reached from the capital by the Morelos division of the Interoceanic Railway. It is a famous pilgrimage resort, and the locomotive which drew our train was appropriately named the "Sagro Monte" (Sacred

Mount), in honor of the hill where stands the celebrated shrine. The trip is full of interest like most of the routes out of the Mexican capital. First across the wide marshes surrounding the city with Lake Texcoco spreading far away to the left, passing close to the isolated great rock, the Peñon del Marques, which in the days of the Conquerors was a bold island rising from the lake's depths, but now stands upon the dry plain with one of the hottest of hot springs gushing from its base; then entering among the foot-hills, running by gray olive orchards, through the heart of a quaint village; now along the reedy shores of Lakes Xochimilco and Chalco, with clear, sweet waters; volcanic cones rising around, and the mountain monarchs rising higher, grander, and more majestic as we draw nearer.

It is about eleven o'clock as the train halts under the shadows of the great cedars of the Sagro Monte. The railway station strikes the keynote of the place. It is an old building utilized for the purpose, with thick walls, and a Swiss-like roof of light shingles weighed down with stones. A prominent wooden balcony, painted green, runs along the second story, and the walls are strengthened with heavy buttresses at irregular intervals, throwing, with the eaves which project four or five feet, together with the balconies, broad bands of rich shadow along the sunlit surface. The whole town has a strong Alpine character produced by its architecture, and its glorious environment of lofty pine-clad and snow-mantled slopes.

The Sagro Monte rises close beside the railway track at the station, and a high wall of masonry encloses the sacred limits. The entire mount is covered with a magnificent grove of densely growing cedars and pines, and the track is literally overhung by low-swinging dark cedar branches. Above us, on a shoulder of the mount, there stands upon a terraced level the chapel and former monastery of the miraculous shrine. We enter at the gate near by, and climb the mount by a sylvan, zigzag path, which for its surroundings might be upon a Berkshire hill-side. It brings us to the chapel of the shrine, but as it continues up the hill we keep on to the summit. There in a clear, open space amid the grove, stands a more ancient chapel. The view is peerless of its kind. Above all, the incomparable heights of the mountains, with soft clouds, like bits of floating down, hovering about their glittering, dazzling peaks; the billows of pine slopes rolling between; the broad, golden-hued valley stretching gently away, basking in the sunshine; the tawny surface varied everywhere by sheets of the young wheat's delicious green. Below is the town, silent as if sleeping, and off in the blue southwest, the valley dips down into the perennial warmth of the lands where summer ever abides.

We descend to the pilgrimage shrine. The chapel is comparatively new, but is architecturally interesting. It nestles in among the ledges, with a broad, flag-paved platform in front, bordered by the adjacent ecclesiastical buildings upon one side, and by a heavy parapet along the edge of the precipitous hillside. Handsome stone steps rise to a beautiful terrace running along the chapel front, and on a level with the interior gallery. The chapel consists of a rotunda crowned by a fine dome. At the main altar is the image representing the apparition which caused the founding of the shrine. It represents Christ in the sepulchre, in which form the Saviour was seen by an Indian upon this spot, so goes the story. The date is modern — some time in the second quarter of the present century, I believe. The story gained credence rapidly, and Amecameca became famous throughout the land, thousands flocking hither annually. Around the chapel are hung hundreds of votive offerings, mostly crude paintings representing miraculous cures, and escapes from danger. The apparition is always represented upon these pictures, the figure floating horizontally in mid-air, making an extraordinary effect.

We took another way down the hill; a gently sloping tree-arched way with gray moss pendant from the branches above, the even stone pavement flecked with sunshine, and the Stations of the Cross standing in stone monuments along one side. At the foot of the hill, the path made a turning with some fine broad steps, and left the sacred limits through a monumental archway.

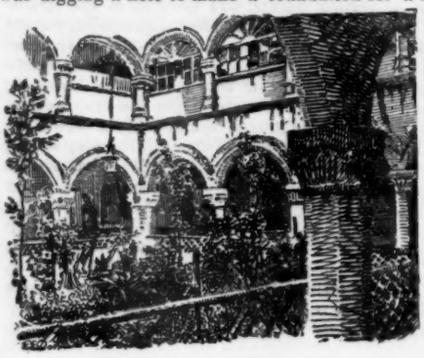
All through the town the narrow sidewalks were about as well sheltered by the broad projecting eaves of the buildings as they would be by arcades. The evidences of modern innovation were seen here and there in the substitution of corrugated-iron for shingles as a roof-covering. The original forms were preserved, however, and as the effect was not materially marred, as lovers of progress as well as picturesqueness we could not find it in our hearts to blame the builders for constructing more weather-proof and enduring roofs.

The town is full of picturesque bits. The main plaza is particularly effective, with its market-place under and around a long colonnade, a very old church, and interesting structures on every side.

Adjoining the church are old convent buildings, and a shy and handsome young sacerdotal student admitted us into a cloister court of thoroughly Romanesque character. The walls were brilliantly whitewashed; the massive arches were supported by short, sturdy pillars; on the walls the arches were emphasized and enriched by a band of carving following their lines. The arches of the upper tier were closed in, forming a corridor, and some of their segments were strikingly irregular; evidently the result of faulty repairs. "*Es muy, muy antiguo*" (It is very, very old), explained the sacerdotal youth, and he said that it was built in the early days of the Conquest.

Being on the lookout for antiquities, we were directed to the shop of a dealer in old junk. Amecameca is an exceptionally fine place for the finding of Aztec relics, for Popocatepetl was a sacred spot, and the people used to bury their idols and their pottery in the sides of the volcano in great numbers. The dealer had no ancient pottery, but he showed us a fine stone idol which he offered for five dollars, but it was too large and heavy for us to take away.

Returning to the railway station to await our train, a bright Indian boy whom we had taken as a guide, brought to us a workman who was digging a hole to make a foundation for a new gateway in the wall of the Sagro Monte, opposite. He had that morning dug up some terra-cotta heads, he said, and he would bring them if we would like to see them. In a minute he returned with three fine heads, well modelled, and with firm, decisive features. They were undoubtedly genuine, having the peculiar, rich, deep color, and smoothness of surface never seen in the imitations. They evidently belonged to the ornamentation of a peculiar kind of vase made by the Aztecs, having a row of heads around the upper edge, as shown by some fine specimens in the National Museum.



"How much did he want for them?" we asked.

"*Lo que Vds quieren darme*" (Whatever you may choose to give me), he replied, evidently unused to bargaining.

We offered him twenty-five cents for the three, and he took it with a pleased smile, and a "*Gracias, Señores*," as if he had made a good bargain in disposing of what had little commercial value through its superabundance in that locality.

It was warm and pleasant sitting in the sunshine, and waiting for the train, but soon the shadow of the Sagro Monte fell upon us, and instantly a chill filled the thin air, while a breeze bearing the breath of snow banks came down from the mountain sides. So we were glad to don the overcoats, which until then had seemed needless.

Sylvester Baxter.

THE ILLUSTRATIONS.

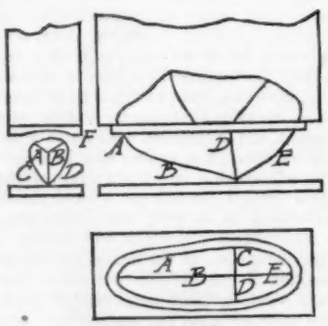
CHURCH OF ST. AUGUSTIN, PARIS, FRANCE. M. BALTARD, ARCHITECT.

THE interesting feature about this church, which was completed some twelve or fifteen years ago, is that, the exterior walls excepted, it is practically an iron church. Another peculiarity lies in the shape of one of the aisles which, as the illustration shows, diminishes in width from the transept toward the front, the space being utilized for chapels. This singularity in plan was caused by the irregular shape of the site. The dome is 80 feet in diameter, and 165 feet to the apex.

THE PLUMBING AND DRAINAGE SYSTEMS IN THE HOUSE OF HENRY VILLARD, ESQ., NEW YORK, N. Y. DESIGNED BY MR. GEORGE E. WARING, JR., NEWPORT, R. I.

For description see article elsewhere in this issue.

LEAD-LIGHT AND STAINED-GLASS GLAZING.[1]—II.



Figs. 5, 6 and 7.

THERE is but little doubt that in the earliest glazed windows the glass was set in lead. It is certain that in the earliest remnants we have it was so; and we must surely give the unknown inventor of the method the greatest credit for ingenuity, for a better framing could not have been devised, and, after superseding lead for a time, we now see the wooden sash-bar succumbing to the ancient method, and especially for the fretwork of ecclesiastical stained-glass windows; nothing but lead would be of any use there. Of course the glazing of ordinary wooden sashes is not within our province, so before proceeding to stained-glass work we will briefly touch on the ordinary leaded casement still to be found plentifully in cottage windows in the provinces. These are formed of every shape and size, some glazed with rectangular and some with diamond-shaped panes. The calmes in which these are set are often very broad in the leaf, much more so than could be used for fretwork.

[1] Continued from page 66, No. 450.

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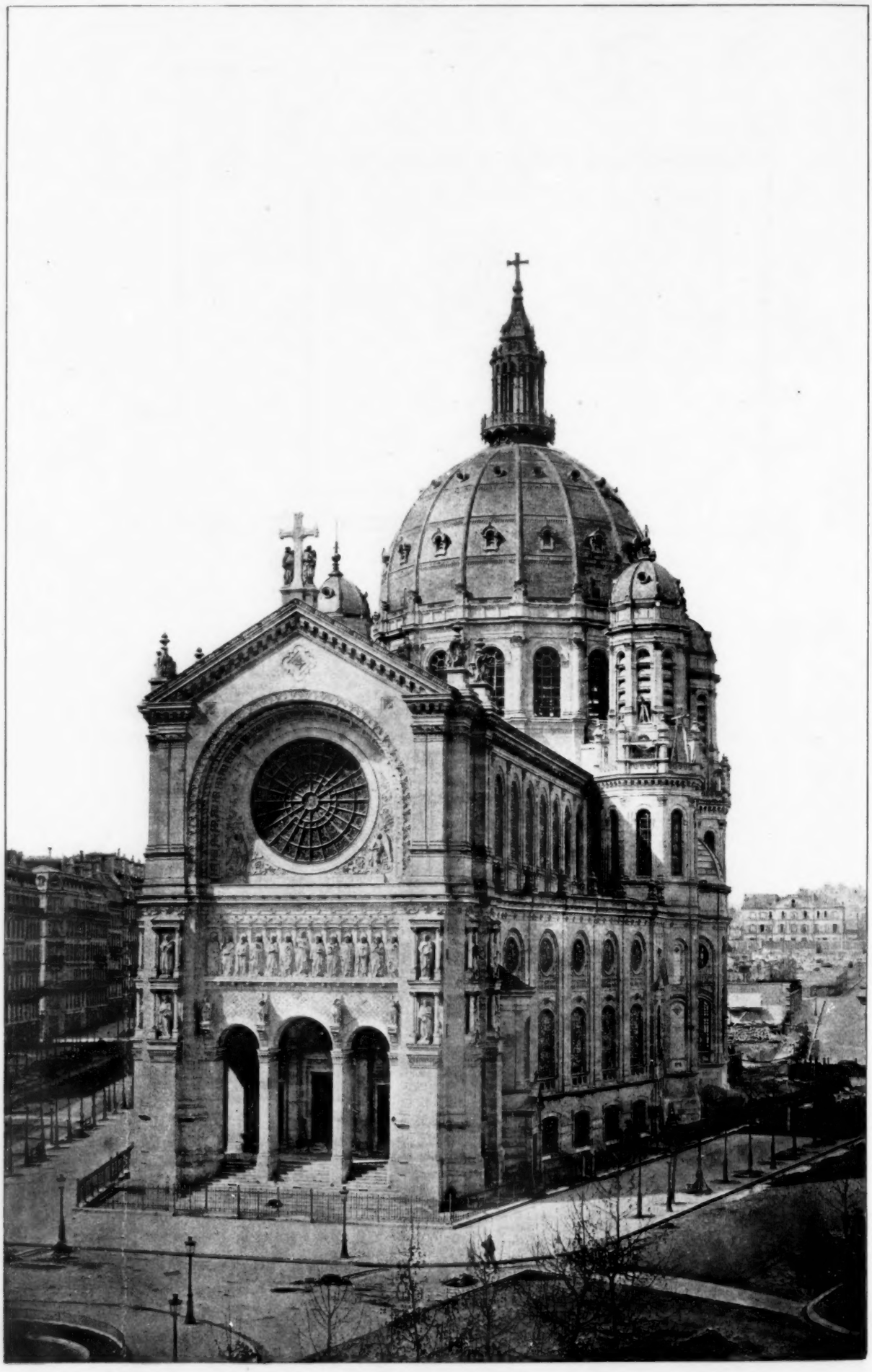

Eglise · de · S · Augustin : Paris · France ·
M · Ballard · Architect ·

PHOTO CAUSTIC. HELIOTYPE PRINTING CO. BOSTON

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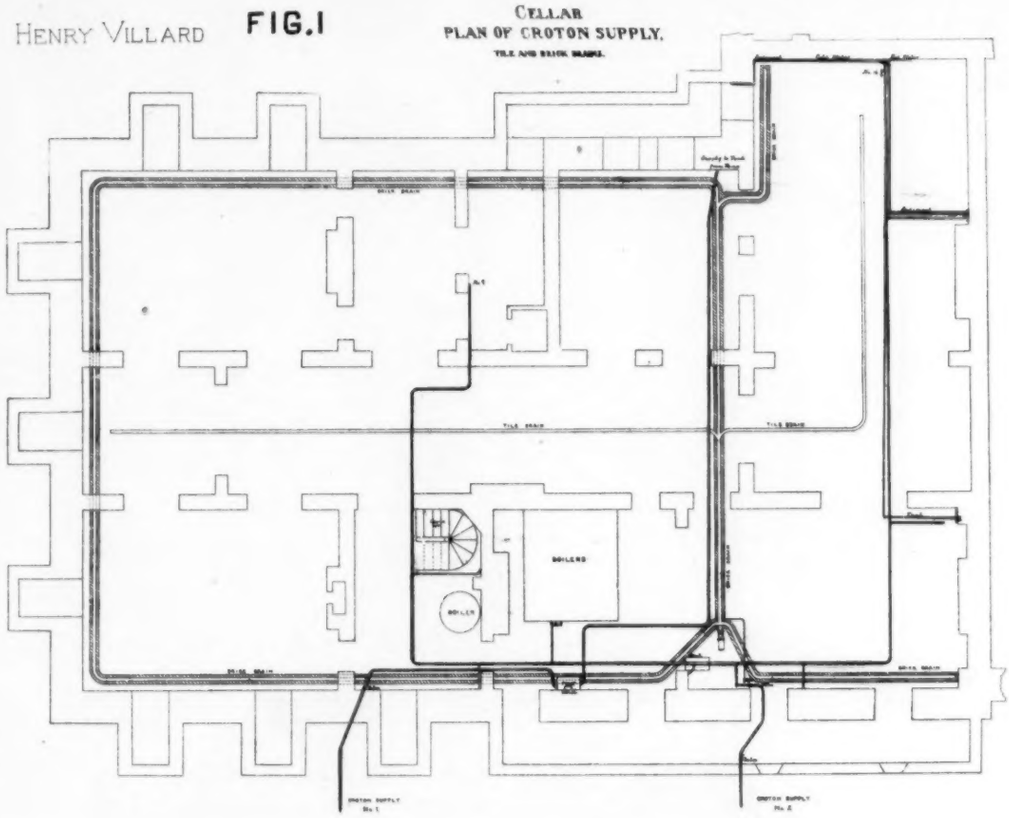
HENRY VILLARD **FIG. 1**

CELLAR
PLAN OF CROTON SUPPLY.
TILE AND BRICK MAINS.



HENRY VILLARD

CELLAR
PLAN OF SEWER, DRAIN
AND WASTE PIPES.

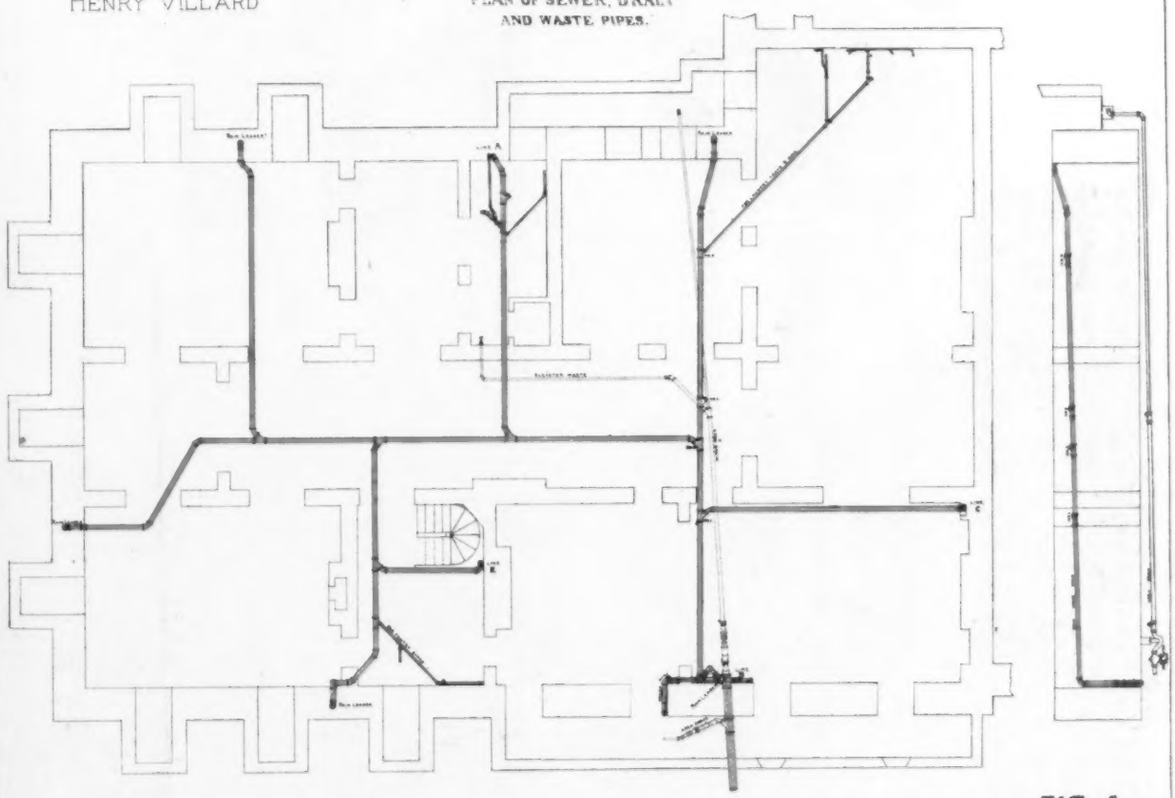


FIG. 3

FIG. 4

THE SUPPLY AND DRAINAGE SYSTEMS

IN THE HOUSE OF

HENRY VILLARD, NEW YORK, N.Y.

BY GEORGE E. WARING JR.

The Heliotype Printing Co. Boston.

THE SUPPLY AND DRAINAGE SYSTEMS

IN THE HOUSE OF

HENRY VILLARD, NEW YORK, N.Y.

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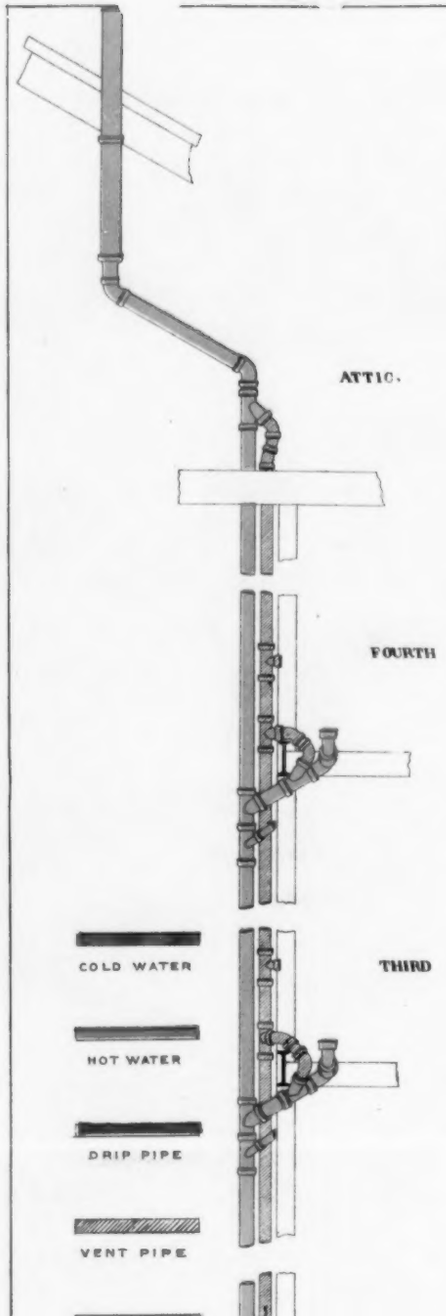
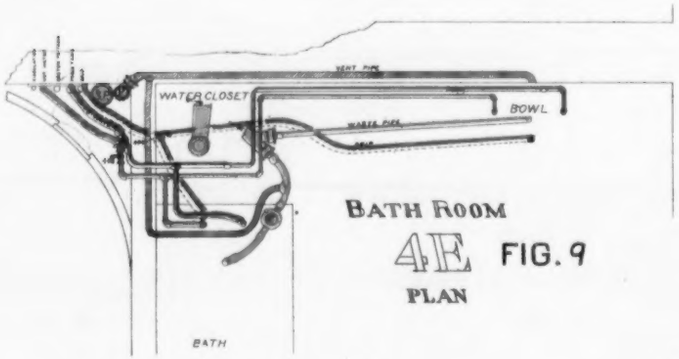
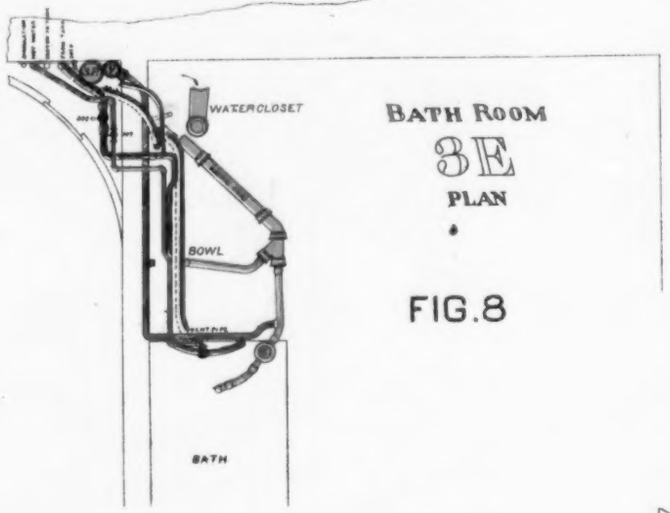




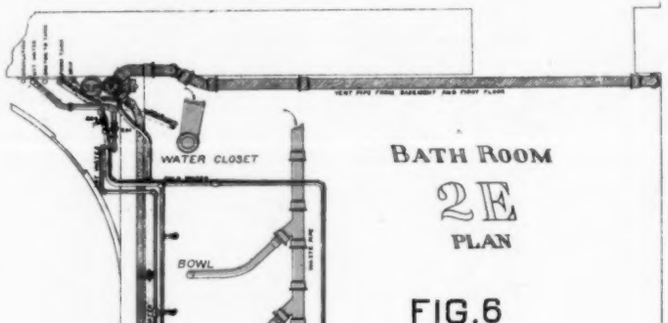
BATH ROOM
4E
PLAN

FIG. 9



BATH ROOM
3E
PLAN

FIG. 8



BATH ROOM
2E
PLAN

FIG. 6

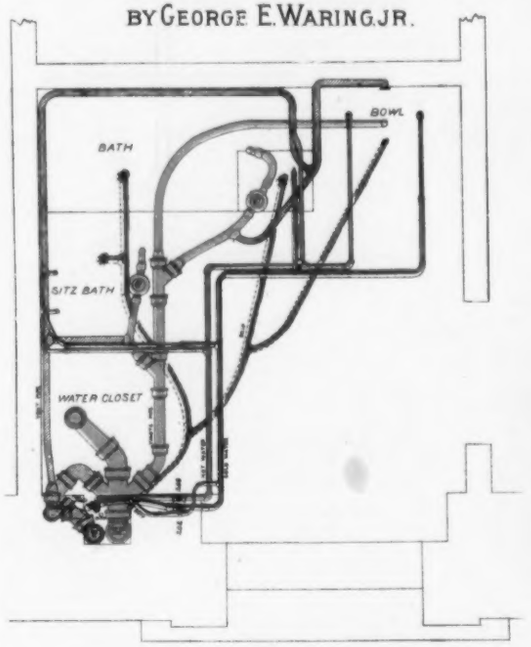
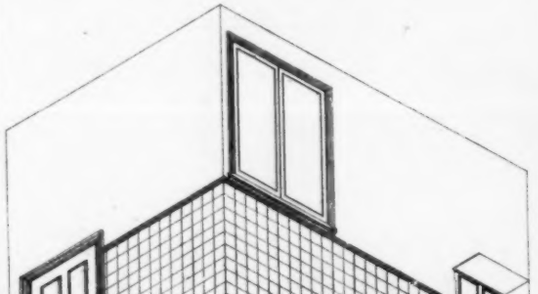


FIG. 11

BATH ROOM
2D
PLAN



AMERICAN ARCHITECT AND

VENT PIPE

SOIL & WASTE PIPE.

HOT WATER CIRCULATION.

SECOND

FIRST

BASEMENT

CELLAR

SOIL AND VENT PIPE

E

ELEVATION

SHOWING CONNECTION OF THE DECECO WATER CLOSET

FIG. 5

BOWL

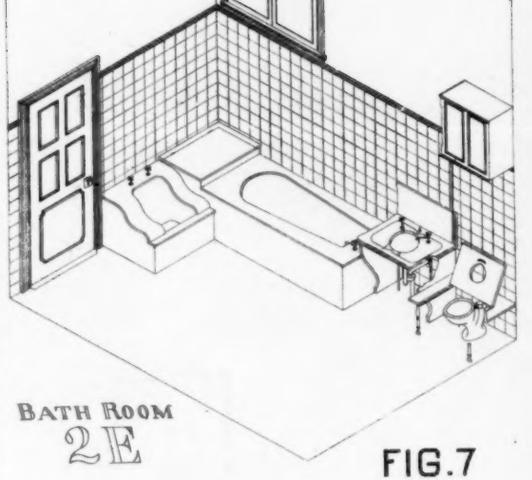
BATH

SITZ BATH

2E

PLAN

FIG. 6



BATH ROOM

2E

FIG. 7

WATER CLOSET

BOWLS

BATH

NORTH

SOUTH

BATH ROOMS

3C

PLAN

FIG. 10

SECOND

FIRST

SUPPLY

SOIL AND VENT PIPE

D

ELEVATION

BASEMENT

CELLAR

FIG. 2

The Heliotype Printing Co. Tremont St. Boston.

Glass is almost universally cut with the glazier's diamond. Who first discovered that the precious gem had this property we do not know, but we are aware that the knowledge is of respectable antiquity. The diamond is, so far as we at present know, the only substance that will *cut* glass. Many substances will *scratch* it, but will not cut. Dr. Wollaston has well characterized the essential difference in these operations, that is to say, between *scratching* and *cutting*. "In the former," he says, "the surface is irregularly torn into a rough furrow; in the latter a smooth fissure or superficial crack is made, which should be continued without interruption from one end to the other of the line in which the glass is intended to be cut. The skilful workman then applies a small force solely at one extremity of this line, and the crack which he forms is led by the fissure almost certainly to the other."

In all cases the diamond that cuts the glass most successfully has the cutting edges of the crystal placed exactly at right angles to each other, and passing exactly through a point of intersection made by the crossing of the edges. In this case it appears to be that portion of one of the edges which is very near the point of intersection that cuts, and scarcely any other. Figures 5 and 6 are an end and side elevation of the end of a glazier's diamond, and Figure 7 a plan, all drawn on a magnified scale. *A B* represents the leading curved part of the cutting edge, and *D* (Fig. 6) and *C D* (Fig. 7) the line of intersection, crossing the line *A B* at right angles, *E* being the following part of the cutting edge. The general figure of the stone is indicated in all the figures by the lines, and its position in a hole formed in the metal block *F*, in which it is first adjusted and afterwards secured by hard solder, is shown.

Figure 8 is a side view, a front view, and an end view of a glazier's diamond mounted with a swivel adjustment for the block when connected with the handle, by means of the screw entering into a gap drilled half-way through and across the metal stem. By this means the cut of the diamond is more easily obtained than when it is mounted firmly on its stem, the swivel permitting the block to play freely, and keeping the cutting edge of the diamond parallel with the edge of the straight-edge or other shaped pattern, it is carried along, and thus removing the difficulty of finding its true position, and leaving the cutters the task of merely attending to the proper inclination of the handle, as to whether it is carried more or less upright, or leaning to the one or other side, to suit the cut, and which a very little practice will soon ascertain.

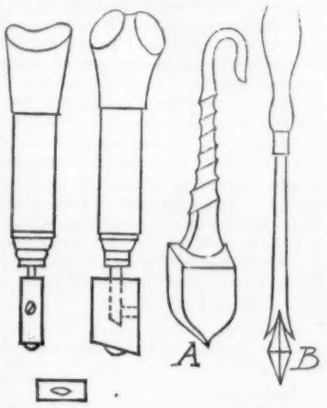


Fig. 8.

Fig. 10.

Recently various tools (principally small wheels of hardened steel) of American invention have been introduced as glass-cutters, but nothing is likely to supersede the diamond for general purposes.

It must not be supposed that because the ordinary glazier makes one diamond last him a lifetime, that the diamond does not wear out. It is usual to reset the diamond, to expose another angle when one is worn down; and in some glass-works, where enormous quantities of glass are cut up, one or two dozen diamonds are used every week, it is said. If you have many panes of glass to cut, it is advisable to cut them by a gauge, as shown at Figure 9, which will much facilitate matters. Brad down to the work-bench a couple of pieces of lath or thin wood at right angles, as at *A B* and *C D*. Then drive in the gauge nails *E F* and *G H*. If an angle of the glass be now placed in the angles of the fixed laths *A B*, *C D*, a straight-edge lath can be held to either pair of gauge nails, as shown by the dotted lines, and will serve to guide the diamond. Or if the glass be cut correctly in a strip of the width required, the two gauge nails *G H* will be sufficient to guide the straight edge in cutting off the panes to the proper length.

The other tools required may be briefly enumerated. Glaziers differ in opinion as to the best tools for soldering the calmes. Some continue to use the old soldering-iron (Figure 10 *A*): this has simply an iron end about a couple of inches square, brought to a pointed edge as shown, which is tinned and has a twisted handle about eighteen inches long, and terminating in a hook for convenience of hanging up. As this has no handle, it is usually grasped with a bit of felt, or sometimes by a couple of "hand-sticks" (which are the hollow sticks made to fit the handle). But many glaziers (ourselves among them) prefer the ordinary copper bit (Figure 10 *B*), which will do anything that can or need be done. The cutting-knife, used for dividing the calmes, has sometimes the form shown at *A*, Figure 11, and is sometimes shaped as at *B*, Figure 11. In the latter the blade has its cutting edge at *a*, and the top of the handle *C* is usually formed of a lump of solder, which is handy for driving home the panes in the calmes, driving a brad or tack, etc. *C*, Figure 11, is the "ladikin," which is a small tool of bone, or box, or beechwood, about sixteen inches long, one inch in width, and three-eighths inches thick, with one end bevelled off for about one-half inch as shown. This is used for opening the leaves of the calme as shown at Figure 12.

The first step in making a lead-light of square panes is to measure the opening and set out on a board or the work-bench in chalk the

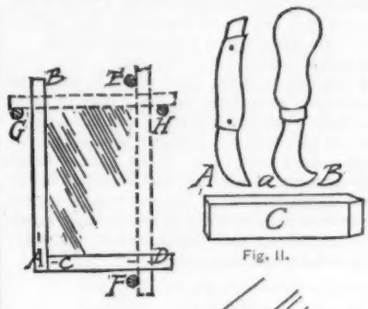


Fig. 9.

Fig. 11.

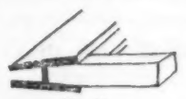


Fig. 12.

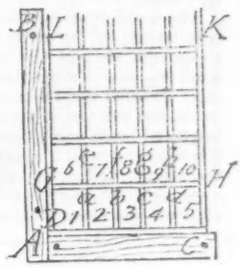


Fig. 13.

number of panes decided on; next the glass can be cut, not forgetting to allow for the thickness of the calme, and this being done, we will proceed to put the casement together, as shown at Figure 13.

Tack down to the bench a couple of laths at right angles, as shown at *A B*, *A C* (Figure 13). Take a calme, and putting your foot on one end to hold it steady, stretch it out, by pulling, perfectly straight; now cut a piece of about the depth of the window, and place it against the lath *A B*, as shown at *D L*, and secure it to the bench by a couple of brads as shown. Next cut another length of the calme the breadth of the casements; open the end of the calme *D L*, with the ladikin, as shown at Figure 12, insert the end of the calme last cut in the one already fixed at *D*, taking care to see that this end is bright, and brad this second calme down, as at *D F*, at right angles to the former, and along the lath *A C*. The calmes are cut with the cutting-knife. The pane of glass 1 is now taken, the ends of the calmes *D E* and *D F* opened out with the ladikin, the square of glass placed in and tapped up home with the heavy handle of the cutting-knife. Having set pane No. 1, cut with the knife a piece of calme of the exact length of the side of the square, taking care to see that the end is bright; open both sides with the ladikin, then place the end in the calmes *D F*, as shown at *a*; pane 2 is now placed in this and carefully tapped home with the handle of the knife; then the lead *b* is cut and placed; next follow pane 3, calme *c* and pane 4, etc., and the first row is glazed. Take especial care that each pane has been knocked in home and that the whole row is tight. Now comes the cross calme *G H*. Stretch another calme and cut it to the proper length and open it up with the ladikin. Insert the end of this in the vertical calme *D E*, and place the ends of the spurs *a b c d* in it. Now begin another row with the pane 6, follow this with the short lead *e*; then the pane 7, lead *f*, pane 8, and till the second row is complete. When all the panes are fixed in and the casement is complete the end calme is fixed, and then the side one, *I K*. All is now ready for the soldering. The bit or soldering-iron is heated and the operator takes a strip of fine solder in his left hand, of an easily fusible kind. He then sprinkles a small quantity of *black* resin at the place to be soldered, places the end of the solder strip to the first and applies the heated bit until a good joint is made, and the solder makes a neat little raised circle at the place. This operation is repeated at each joint until all are secured. Some workmen prefer "killed" spirits of salts (hydrochloric acid) to resin for the flux. The bit or iron should not be too hot and should not be held in contact with the calmes too long. It is important that the ends of the lead be bright, or a good joint cannot be secured. The bands which secured calmes *A B D*, *B E* to the brads must now be loosened, the light turned over, and the other side be soldered in a similar manner.

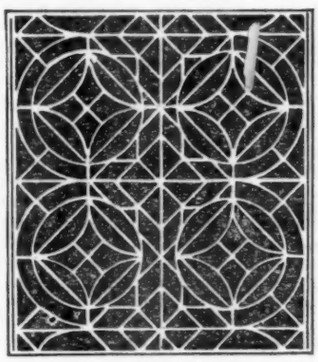


Fig. 14.

Next the "bands" or "ties" have to be fixed. These are small strips of lead or little bits of copper wire, intended to secure the lights to the "saddle-bars" of the window. The saddle-bars are horizontal bars of small iron rod crossing the window-opening, their ends being set in the stone-work or wood, and are intended to support the glass. As many bands should be soldered on as the glazier deems requisite. Copper wire ties are generally preferred for fretwork. In the rectangular iron frame for opening casements, to which the lead light is fitted; the smith generally drills small holes all round, and the glazier will require to solder his ties around the lead light at such places as will correspond with these holes, and in such a manner

that the ties stand up at right angles to the calme to which they are soldered. They must also be of such size that they will pass through the holes. These ties are put through the holes in the casement frame, cut off flush with the top surface of the iron. A bead of solder is now dropped on the end of the tie, well spread with the bit, and finally pressed down into a nice flat round bottom by the sudden and momentary application of the thumb, well wetted with saliva.

The lead-light is now finished all but the "cementing." This process is adopted for several reasons. In the first place it helps to secure the glass in the lead-work, something as putty does in sash-windows, then it keeps the whole window water-tight and wind-tight, etc. Proceed thus: take an old sash-tool and a little stiff lead-colored paint, and rub the joints and calmes therewith. Then take a small blacklead brush and a small quantity of whiting, and with this brush rub the paint until it appears all brushed out of the crevices, brush off the whiting, and repeat the process with some lamp-black, and brush away until the joints become as lustrous as if blackleaded. Finally, clear off and clean the glass in the usual way.

VENTILATION AND HEATING.[1]

IN one of the old tales for children, a princess who incurs in infancy the hatred of a fairy godmotl er is doomed, under heavy penalties, to entire seclusion from the light of day during the period of her minority, and to make this seclusion bearable, the ingenuity of the court is taxed to the utmost to imitate within the walls of a palace the light and color of the open country. The legend is typical of the condition of civilized humanity at the present time. Doomed by the supposed requirements of fashion and business to an indoor and artificial existence, life becomes one long struggle to maintain itself under unnatural conditions, and scientists are employed and money is lavished to furnish within our palace prison walls the healthful atmosphere that the beggar in the street may enjoy gratis. Most of the ills that flesh is heir to may be avoided by living out of doors in any healthful climate. Even to live out of doors during working hours so fortifies the system against indoor poisons that the evil effects of close sleeping-rooms on the condition of the laboring man is hardly noticeable. After centuries of experiment on permanent hospitals, physicians have been driven back to the tent or temporary one-story pavilion as the best form of shelter for the sick and wounded, so far as climate will permit its use. No practical arrangement of ventilating machinery can give more healthful results than the frequent flush of fresh air from open doors and windows.

The English settlers of America were an open-air-loving people. Their descendants have improved on the parent stock in many ways, but have deteriorated in this. The reform of the morals and habits of a people is not the special business of architects, except perhaps in indirect ways. While they may advise, they cannot dictate what their clients shall build; but their employer's election being made, they can do much for their safety, comfort and enjoyment, by the skilful treatment of given conditions. They co-operate with the physician and sanitarian to make an artificial mode of life as healthful as possible under the circumstances. In doing this the first difficulty encountered is in the supply of pure warm air; and this, in New England at least, in a climate of extremes and sudden changes.

The dwellers in our northern cities are about as sensitive to cold draughts as their ancestors would have been if denuded of their clothing. Skins are bleached by close and heavy covering, and softened by insensible perspiration. The circulation of the blood is sluggish, and reaction from effects of exposure slow and uncertain. This hot-house growth is especially characteristic of our women and children, and we must treat their condition as we find it.

Pure air is free to all if taken out of doors, as nature intended; but pure warm air indoors and in cold weather is a luxury unattainable in perfection, and only approximated to at great expense and as the result of unceasing vigilance. There is no royal road to ventilation, and all ventilation necessitates waste, *i. e.*, the throwing away of warm air.

That much of the world's progress in sanitary matters is due to the work of specialists, few would be disposed to deny; but the constant study of one class of evils is apt to lead to the neglect of all others. The experimenter who devotes his life to the perfection of vaccination for hydrophobia, or faces death in his efforts to identify the germs of cholera, will laugh at the theories of the Ruskinite who finds cause for the decadence of humanity in the introduction of steam and a disregard of the teachings of the Old Testament. The advocate of fire-proof construction insists that walls and floors shall be solid and non-conducting; while the apostle of fresh air would perforate them with a labyrinth of pipes and flues, ready channels for the spread of fire. Special devotion to one branch of reform tends to a certain positiveness of conviction and statement that holds general intelligence in slight esteem.

One of the most difficult branches of the architects many-sided calling is mediation between his employer and the increasing number of specialists, and in the proper interpretation of the great excess of printed matter which is suited neither to the wants of the amateur nor the expert. The treatise under consideration seems to add another to this class. Originally printed in the *Sanitary Engineer*, under the title of "Letters to a young Architect," it has been put into book form with some changes and additions. The author frankly admits that "it is not intended to be a systematic manual on ventilation for the skilled architect or engineer, but rather to present the general principles which should guide one in judging of the merits of various systems of and appliances for ventilation." But the young architect, while he might find in it many useful facts culled from various and more or less reliable sources, and useful reproductions of several notable examples of ventilation, with their illustrating diagrams, together with much sharp criticism of systems and practitioners, including those of his own calling, would not be able to learn from it nearly all that he ought to know; whereas the amateur would probably be left after its perusal in a condition of confusion and discouragement, or driven to the office of an expert adviser.

It is an ungracious task to find fault with the tone of a work which professes to be devoted to the enlightenment of the reader, but in this case the aggressiveness of many of the statements seems to require more than a passing notice. Architects, some popular belief to the contrary notwithstanding, are as willing "*as a rule*" to sit at the feet of wisdom and experience, and to learn what can be learned in no other way as are other classes of men; but many of us are old enough to have seen the most advanced theories of our earlier study become objects of ridicule in the light of the ampler knowledge of to-day. Such experience leads to the feeling that great modesty of claim and reserve of positive assertion are becoming in the treatment of the yet undeveloped and inexact sanitary sciences. It is not only a useless manner of criticism, but only a very long and intimate knowledge of the practice of a profession should justify an author in saying, as on page 48: —

"As a rule, architects make no special provision for the fresh-air supply to a furnace, and the furnace-setter is left to adjust this as best he can. . . "

And again: —

"As a rule, our architects give no attention to the details of heating apparatus, and prepare their plans without any special reference to such details, other than providing space and a chimney-flue for the boiler, and other flues in the walls."

This neglect is still further emphasized by the statement on page 88, that

"Each house is, to a certain extent, a problem by itself, but it is a very simple problem, which any moderately ingenious tinner or sheet-iron worker will have no difficulty in solving, if he will only master the few simple laws of the movement of air, which have been given in previous chapters.

"Every stove-dealer should possess this knowledge in order to deal understandingly with the complaints which will be made to him about bad draught, etc., etc. . . ."

Although the road to science is thus smoothed for the intelligent "tinner," the writer goes on to say, on page 161: —

"I am by no means advising that every architect should endeavor to make himself an expert on the subject of heating and ventilation, but he ought to know enough of these subjects to see his own ignorance, and to be able to judge of the relative merits of those who do profess to be experts, and who come to him seeking employment, and also he should know enough, for the sake of his own reputation, not to be dogmatic in his assertions about the merits of this or that method which he has never seen tried, and with regard to which he has no scientific data whatever."

That ignorance and dogmatism are to be deplored, and that all knowledge is a good thing are propositions that few will be disposed to deny; but are such moral truisms very essential parts of the science of ventilation? Our author does not stop with general principles, however, but, on page 14, maps out more in detail the duty of a professional adviser as follows: —

"I do not mean . . . that when a gentleman comes to an architect for a plan for a house, giving the usual data as to location, dimensions, and proposed cost, that he is to be asked as to how much of this cost he is willing to devote to ventilation. It is the business of the architect to tell him that, and to be careful, from the very beginning that, even in his first rough-sketch-plans, satisfactory arrangements for ventilation are included. It is his duty also to see that, after the various additions to the plan which will be made at the suggestion of the owner's wife and several of his friends on whose taste he relies, have increased the

[1] *The Principles of Ventilation and Heating and their practical Application.* By John S. Billings, M. D., LL. D. (Edinb.), Surgeon U. S. Army. Profusely illustrated; large 8vo, cloth. Price, $3.00, postage paid. Address, *The Sanitary Engineer*, 140 William Street, New York.

cost above what he had intended, he does not, in the spasm of economy and retrenchment which will attack him, make a reduction in some point which will affect the ventilation, rather than on some of the ornamental work outside."

So much for the dwelling-house; but in another class of edifices the moral obligation is raised to a standard involving a moderate prospect of martyrdom to principle.

"When it comes to the planning of such a building as a public school, I consider it to be the duty of the architect not only to advise, but to insist upon proper arrangements for heating, ventilation, drainage and plumbing . . . and it will be his duty to decline to have anything to do with the matter rather than suffer himself to be used as a tool to execute work which he knows will be dangerous to the health and life of the children of his fellow-citizens."

The question of the moral responsibility of the architect to the public, as opposed to the interests and even the commands of his employer, is one on which many otherwise sensible people have very peculiar ideas. That there is a responsibility few would question, but that it is of that degree to enforce the loss of all compensation for work on which there may be an honest, and even an expert, difference of opinion is, to say the least, absurd. An architect is responsible to the world to the extent that everybody is, and no more. It would be well for justice if all errors of omission and commission were as plainly to be seen and judged as his.

But leaving further discussion of taste and morals, let us see from the writer's own words how simple and easy of attainment is a satisfactory system of heating and ventilation. To begin with the highest standard, we find, on page 16, that: —

"Perfect ventilation can be said to have been secured in an inhabited room only when any and every person in that room takes into his lungs at each respiration air of the same composition as that surrounding the building, and no part of which has recently been in his own lungs or those of his neighbors, or which consists of products of combustion generated in the building, while at the same time he feels no currents or draughts of air, and is perfectly comfortable as regards temperature, being neither too hot nor too cold. Very rarely, indeed, can such perfect ventilation be secured if the number of persons in the room exceeds two or three; in fact, I have never seen but three or four attempts in this direction."

Farther on he continues, page 17,

"that it would require at least thirty times as much coal to heat a room thus supplied as would be used for heating a room of the same size having only the ordinary heating and ventilating arrangements."

But this high standard, although not the perfection of nature, even the specialists abandon, and allow that the architect or other authority may be permitted to furnish in place of Nature's element a compound more or less contaminated by injurious elements, and we find as a guide that: —

"Good, ordinary ventilation is to be secured by keeping the vitiated air constantly diluted to a certain standard."

What this standard is, is variously stated by different authorities, the tendency being to increase the proportion of air to poison with each new set of experiments — a tendency certainly favored by the dictates of common sense, and with which the writer in question seems to agree. The serious obstacles to this tendency are, however, indicated in the admission that: —

"First of all, then, keep in mind this axiom, which applies especially to the large cities in our Northern States, viz.: In this climate it is impossible to have at the same time good ventilation, sufficient heating, and cheapness.

And again: —

". . . the sanitarian who asks for a liberal allowance of fresh air combined with a comfortable temperature and freedom from draughts, will find, if he sets a high standard, his views will be promptly condemned as being unpractical."

And again: —

"Finally, it should be remembered and impressed on the managers of public institutions that every system of heating and ventilating apparatus requires constant care as to its cleanliness, efficiency, and adjustment to the demands of the season and the hour, to produce the best results, and that the most wasteful of all expenditure is to provide an elaborate and costly apparatus, and then intrust it to the care of an ignorant or careless engineer, on the ground that he is somebody's "nephew," or is "an active politician."

That there is sound truth in all this may be freely admitted, even in the covert attack in the last sentence on our American "spoils system." But the difficulty is that in connection with the various impressive remarks on the duty of the architect it proves too much. No such demands for absolute or approximate perfection are made on any other calling. Even the skilled physician cannot always secure or maintain health.

The standard of attainment demanded in the ventilation of buildings, if applied to all other departments of building, would be simply prohibitory. The reformer must begin with the *occupants* of our buildings. A craving for pure air and a recognition of variations in its purity must precede the demand for expensive appliances and close supervision. We could instance a number of costly systems of ventilation, fairly successful for a time, that have stood disused for from ten to twenty years, because the public did not demand the pure air to which they were entitled and for which they paid liberally each night. This condition of affairs is notorious, and should not be ignored by any apostle of this particular reform. Such is the apathy of the public, that an architect seldom has the opportunity to make a generous provision for ventilation without a considerable personal sacrifice. There is a good deal of random talk and writing on the subject, but no great number of people avoid a draughty church, or discriminate against a theatre where they are moderately sure of getting a headache; consequently no money-pressure is brought to bear on proprietors, and the architect is left powerless in their hands. Show, convenience, and a decent regard for safety are known to pay, and can be "insisted on." Beyond these, the professional advice is politely listened to, carefully considered in the light of profit and loss, and too often ultimately disregarded.

THE LONGEST BRIDGES IN THE WORLD.

A LATE number of the *Moniteur Industriel* gives the following as a list of the twenty-six longest bridges in the world: —

Montreal Bridge, over the St. Lawrence,	8,791 L. feet.
Brooklyn, over the East River,	5,989 "
Rapperswyl, Lake Zurich,	5,333 "
Volga, over the Sysran, Russia,	4,947 "
Moerdyck, Holland,	4,927 "
Dnieper, near Jékaterinoslaw, Russia,	4,213 "
Kiew, over the Dnieper,	3,607 "
Barrage-bridge, Delta of the Nile,	3,353 "
"Kronprinz Rudolph," over the Danube at Vienna,	3,266 "
Dneiper, near Krementchoug, Russia.	3,250 "
Bommel, over the Meuse, Holland,	3,060 "
Two Bridges of Rotterdam, over the Meuse,	2,833 "
Mississippi Bridge (?),	2,588 "
St. Louis, over the Mississippi,	2,574 "
Saint-Esprit, over the Rhone, France,	2,460 "
Kiulinbourg, over the Rhine, Holland,	2,347 "
Cincinnati, over the Ohio,	2,233 "
Chaumont Viaduct, Valley of the Suize, France,	2,000 "
Menai, England,	1,957 "
Cubzac, over the Dordogne,	1,817 "
Varsovie, over the Vistula,	1,693 "
Iron-bridge at Bordeaux, over the Garonne,	1,667 "
Stone-bridge " " "	1,623 "
Beaucaire, over the Rhone,	1,460 "
Tours, over the Loire,	1,457 "
Alexandre, at St. Petersburg,	1,350 "

Of the above, the sixth on the list has just been opened; the Rapperswyl bridge is merely a pile structure and is only 13 feet wide; the Sysran bridge, over the Volga, carries the Orenbourg Railway, and was only finished in 1880; it has 13 spans, and is raised 131 feet above the level of the river; it cost 13,500,000 francs ($2,700,000).

The Moerdyck bridge carries the Anvers and Rotterdam railways over the Meuse, which is about 8,800 feet wide at this point, and has been reduced by dykes; it has fourteen spans of 328 feet each. It was commenced in 1868 and finished in 1871; it cost about 12,000,000 francs ($2,400,000).

The above list is given as printed, but the compiler in the *Moniteur* has in his table wholly ignored many of our long American bridges. A complete list of the length of modern iron bridges is not just now accessible, but among the omissions may be noted: —

The B. & O. bridge, at Havre de Grace (being built),	6,000 L. feet.
Wooden bridge at Columbia, Pa.,	5,366 "
Louisville R. R. bridge, over the Ohio,	5,218 "
Cincinnati Southern R. R. over Ohio,	3,950 "
Havre de Grace bridge, over Susquehanna,	3,271 "
Dauphin Bridge, over Susquehanna,	3,590 "
Monongahela bridge, near Homestead,	5,300 "
Plattsmouth bridge, over Missouri,	3,000 "
Quincy bridge, over Mississippi,	2,847 "
Omaha bridge, over Missouri,	2,750 "
Keokuk, Iowa, over Mississippi,	2,008 "
La Crosse bridge, over Mississippi,	1,672 "
Booneville bridge, over Missouri,	1,651 "

To the above many other long bridges could doubtless be added, were the data at hand. The longest bridge in the world was the late Tay bridge, which was 10,320 feet in length, and the Forth bridge now under construction is to be about 9,200 feet long. Although it does not strictly belong to the class in question, the New York Elevated Railway is really a continuous iron-truss bridge, and the aggregate length is thirty miles. — *Engineering News.*

THE *SANITARY ENGINEER'S* ATTACK ON MR. PUTNAM.

BOSTON, Aug. 12, 1884.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — The criticism which appeared in the *Sanitary Engineer* of last week, on the report on the "Siphonage and Evaporation of Traps," contains many unpardonable misstatements, one of which, since it consists in a very unjust aspersion on my personal character, I should much like to have you point out and correct in your next issue.

The *Sanitary Engineer* says that I had invented and patented a

new device for a trap, and made no mention of it when the appropriation for the tests was made by the City Board of Health, and that I used part of the money appropriated to test my own device.

This is absolutely false. The invention of my trap, from the first idea to its final complete development, was made several weeks subsequently to the time when the Board of Health, through its chairman, made the appropriation, and as soon as the idea occurred to me, and before the preparation for the tests had begun, I mentioned it to the chairman, with the statement that I proposed to patent it, to ascertain if the fact of my having made such a discovery would affect my relations with the Board in the matter of these tests. I was informed that it would not, provided none of the money appropriated were used in testing my device. None of the money was so used. On the contrary two-thirds of the expense of the entire investigation was borne by myself, as well as the expenses of preparing the report.

A short record of the tests on this trap was included with the rest without comment, as showing a simple remedy for the dangerous and expensive trap-ventilation; some of the evils of which are pointed out in the report.

Had the *Sanitary Engineer* applied to the only source from which the correct information on these points could evidently possibly have been obtained, it could have avoided its errors and evinced a desire to present the truth. As it did not follow this course, the day after the issue of the article, I wrote a reply and sent it at once to the *Sanitary Engineer*, with the request that it publish the correction in its next issue. Respectfully yours,

J. Pickering Putnam.

CRACKED BRICKWORK.

Pierre, Dak., July 29, 1884.

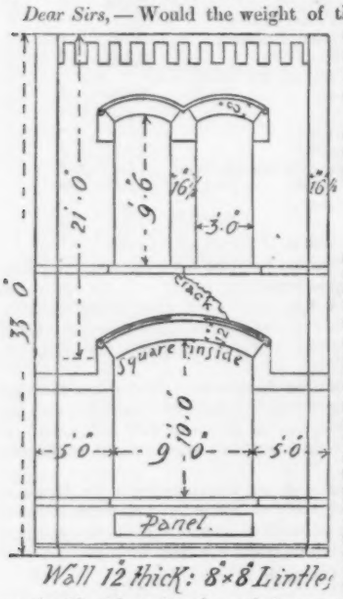
To the Editors of the American Architect: —

Dear Sirs, — Would the weight of the brickwork on arch in enclosed sketch cause the wall to crack where shown? Also, is there enough weight to cause spreading of walls?

Please favor me with an early reply, either by mail or through columns of the *American Architect.*

Respectfully yours,

Dakota.



Wall 12 thick: 8×8 Lintle

[We should say that the crack shown was due to the shrinkage of the mortar joints in the arch, either by drying or compression, which had allowed the crown of the arch to settle, and the weight concentrated under the central pier above had pushed down the brickwork below it to follow the retreating arch. If the lintels behind the arches are of wood, the shrinkage of this would increase the effect. We do not quite understand from the drawing whether there are return walls at the sides of the bay shown. If so, their mass, with that of the pier, ought, we think, to be sufficient to resist the thrust of a brick arch laid in reasonably adhesive mortar. Without the help of return walls we should wish to lay the arch in cement, and thus fortified we should feel pretty safe about it. — Eds. American Architect.]

NOTES AND CLIPPINGS.

Chestnut Timber. — There is a common tradition that the timbers of old churches were made of chestnut wood. If this were the case, chestnut trees must once have been common in countries where now they are extremely rare. A skilful chemist, M. Payen, has procured a large number of specimens of timber from the old churches and buildings in Paris, which he has subjected to careful examination, and he believes that none of them were chestnut. If letters are drawn upon oak and chestnut planks, by means of pure sulphate of iron dissolved in distilled water, the characters appear at once, in black, upon the oak, and in deep violet upon the chestnut. Ammonia produces a red color, of short duration upon the chestnut, paler and less distinct upon the oak. All the French and American varieties of oak show very distinctly, on their transverse sections, medullary rays crossing the woody fibres from the centre across the circumference. Chestnut timber possesses only concentric layers. — *La Science pour Tous; Les Mondes.*

The Music of the Buddhist Bells. — The sounds of Japan, says an exchange, are nearly all unmusical to the foreign ear, the exceptions being the laughter of the women and the sweet, almost indescribable melody of the Buddhist bells. Some of the latter, called *tsuri-gane*, are of the ordinary shape, weigh several tons, are wonderful specimens of bronze castings, and are suspended in strongly-built belfries; others, termed *rin*, concave in form, are portable, and are used in the temple service, or carried about the country by begging priests. Beyond their graceful outlines and beauty of metal, there is, at the first glance, little in the *rin* to indicate the high value placed by the Japanese upon these bronze bowls, but no sooner is the slightest touch applied to their rims than their extraordinary qualities are revealed and the listener acknowledges that, in the making of bells, as in many other arts, the Japanese possess secrets as yet unsolved by science. Although every Buddhist temple in the empire contains one or more of these *rin*, few of those that have been dedicated to religious use are ever offered for sale. They can only be secured after the destruction of some temple by fire, or by the poverty of the priests, who, deprived of Government patronage and support, have of late years been compelled to rely upon their congregations for subsistence, and have parted, piecemeal, with their most cherished treasures. The first *rin* used in Japan were brought from Corea, during the sixth century, by the Buddhist missionaries, who "peacefully invaded Nihon, and succeeded in converting the mass of the inhabitants to their faith." These antique objects, some of which are still preserved in the temples, were simply brass bowls, such as had been used for many centuries in India, and were only slightly sonorous. The æsthetic Japanese quickly improved upon the Corean bell by making a peculiar combination of metals, which they cast and hammered until they produced the wonderful-toned *rin* that excite the admiration of the foreigner and affect their own people so profoundly. The traveller, on approaching a Japanese temple, often hears a low, humming sound that, upon his listening intently, resolves itself into the one prayer of the Buddhist devotee. Then follows a rapid succession of strokes upon the *rin*, and musical vibrations that are sometimes prolonged nearly two minutes, and whenever heard possess the same wonderful charm that caused Mark Twain to say, while listening to one of these bells, "I don't believe I shall ever hear more heavenly sounds until I reach the Golden City." Very many *rin* have the Buddhist prayer inscribed upon their rims, or bear the names of pious persons who united to present them to their temples; others are *ex voto* or *in memoriam* offerings; some of the dedications being quite touching in their simple earnestness.

The Bartholdi Statue and the Colossus of Rhodes. — It may not be without interest to compare this curiously ingenious contrivance, evolved by M. Bartholdi from a little statuette one-third smaller than life, with what is known as the Colossus of Rhodes. M. Bartholdi's figure of Liberty stands, without reckoning the diadem, 105 feet high; but the extreme height from the feet to the upper end of the torch held by the outstretched hand is 137 feet 9 inches. The statue will be placed on a granite pedestal 83 feet high. To those who like to be told that the letters in the inscription, "*Tu es Petrus*," running round the interior of the drum of the Dome of St. Peter's at Rome are as tall as a Life Guardsman, and that the pen held by the Apostle St. Luke in one of the spandrils of the arches of the dome is 11 feet long, it may be interesting to learn that a person six feet in height, standing on the lips of M. Bartholdi's head of Liberty, can only just reach the eyebrow; that people can jump with ease in and out of the tip of the nose, and that the eyes measure 6 feet from corner to corner. Turning to the old "Wonder of the World," we find that it was the largest of the hundred colossal statues of the Sun, which at one time embellished the city of Rhodes. It was upward of 105 feet high; few persons had arms long enough to embrace its thumb; the fingers were longer than the whole bodies of the majority of the statues then extant; the hollows of the limbs, when broken, resembled caves, and inside might be seen huge stones inserted to keep the statue in position. It took twelve years to erect, and cost three hundred talents. The story that the legs of the Colossus extended across the mouth of the harbor is generally considered to be a fiction; but that it stood close to the entrance of the port of Rhodes, and was made to serve as a pharos or light-house, seems certain enough. It was overthrown and smashed to pieces by an earthquake fifty-six years after its erection. For 903 years the fragments of this Wonder of the World strewed the mole at Rhodes, and then they were sold by the Caliph Omar to a merchant at Emesa, who carried away these prodigious marine stores on the backs of 900 camels. Hence Scaliger calculated that the aggregate weight of the bronze must have been 700,000 pounds. — *London Telegraph.*

The Paseo de la Reforma, Mexico. — The Paseo de la Reforma, in the city of Mexico, is pronounced by travelled persons to be the most beautiful drive in the world. Beginning at the main plaza in the centre of the city, and going westward to the castle of Chepultepec, the distance is exactly 5,450 yards. The "Paseo" proper begins at the foot of San Francisco Street, the Broadway of Mexico, and the exact line of demarcation is at the equestrian statue of Charles IV of Spain — which, by the way, is the first bronze cast in this hemisphere, a beautiful work, executed by an Indian artist, Tolsa. Beginning with the statue are six *glorietas*, or circles, each 400 feet in diameter. In the centre of each a statue is to be placed, and others at proper intervals along the way. In the second circle is a magnificent Columbus in marble and bronze, the great explorer standing on the summit of a lofty pedestal, and sitting at the four angles are the Spanish fathers to whom Mexico considers herself indebted for her present civilization — Fray Bartolme de Las Casas, Fray Viego Deza, Fray Pedro de Gante and Fray Juan Perez de Marchena. In the next circle will soon be placed a Guatimozin, the last Indian emperor of Mexico, which is to cost $100,000, and, judging from photographs of the design, will far exceed the others as a work of art. Then a Cortez is to come in the next *glorieta*, which, as Bishop aptly says, "will stand face to face with Guatimozin, their countrymen, now one people, the heroic defender and the heroic conquerer, the two characters of such contradictory traits within themselves, who both acted according to their lights in their day and generation, and but followed the path of inevitable destiny." At the fourth circle, crossing the Paseo in its centre, will be placed a magnificent arch of liberty, designed to be one of the most imposing structures ever erected by man to the mythical goddess, who in this country is surely blind. The arch will cost $250,000, and is intended to be as durable as the mountains looking down upon it. Each of these *glorietas* is described by massive marble and granite seats, in continuous crescent form, carved in artistic style. The width of the Paseo, including sidewalks, is 170 feet, and is shaded by a double row of ash and eucalyptus trees. Maximillian laid out this Bois and Central Park, the afternoon drive promenade of fashionable Mexico, and his wife planned the Zocole opposite the grand cathedral. — *Correspondence of Springfield Republican.*

BUILDING INTELLIGENCE.

(Reported for The American Architect and Building News.)

[Although a large portion of the building intelligence is provided by their regular correspondents, the editors greatly desire to receive voluntary information, especially from the smaller and outlying towns.]

BUILDING PATENTS.

[Printed specifications of any patents here mentioned, together with full detail illustrations, may be obtained of the Commissioner of Patents, at Washington, for twenty-five cents.]

302,887. BRICK-MACHINE.—Frances C. Burrell, La Salle, Ill.

302,896. ROOF-BRACKET. — Eben W. Dailey, West Berlin, Mass.

302,898. TOOL-STOCK.—Daniel F. Dwyer, Brooklyn, N. Y.

302,905. BOLT-HINGE. — Richard H. Garland, Chicago, Ill.

302,913. HEATING APPARATUS. — Isaac Kirk, Warren, O.

302,916. FLY-SCREEN-DOOR ATTACHMENT.—Phebe R. Lamborn, West Liberty, Io.

302,924. WINDOW-TONGS. — Alexander McMillen, Lowell, Mass.

302,942. PAPER-FLOOR BLOCK. — William E. Rockwood, Indianapolis, Ind.

302,943. PAPER FLOOR. — William E. Rockwood, Indianapolis, Ind.

302,980. FIRE-EXTINGUISHER AND ALARM. — Chas. E. Buell, New Haven, Conn.

302,981. SASH-HOLDER. — Eber C. Byam, Rochester, N. Y.

302,991. AUTOMATIC SPRINKLER, OR FIRE-EXTINGUISHER. — Walter Baker Fowler, Lawrence, Mass.

303,003. SCREW-DRIVER. — George W. Hael, Minneapolis, Minn.

303,004. FIRE-ESCAPE. — Richard Hammill, Chicago, Ill.

303,009. OPAQUE OR SEMI-TRANSPARENT ENAMELED GLASS OR COLORED GLASS. — Ernst Franz Wilhelm Hirsch, Radeburg, Saxony, Germany.

303,023. EARTH-CLOSET.—Cyrus D. Lane, Batavia, N. Y.

303,027. BIDET. — James J. McComb, Dobb's Ferry, N. Y.

303,028. PILE FOR THE MANUFACTURE OF BEAMS. — James K. McDonough, Philadelphia, Pa.

303,042. FIRE-ESCAPE. — Lester G. Pettis, Platea, Pa.

303,055. FIRE-ESCAPE. — George Ryer, Rocky Hill, Conn.

303,074. STONE-CUTTER'S MALLET. — Jas. Thompson, Boston, Mass.

303,077. COMBINED RULE AND SQUARE. — George D. Umland, Osceola Mills, Wis.

303,174. HEATING APPARATUS. — Jas. R. Mason, New York, N. Y.

303,181. MASON'S AND BUILDER'S SCAFFOLD.—Orrin Osborn, Gloversville, N. Y.

303,183. LOCK. — Dexter W. Parker, and Edmond B. Slater, Meriden, Conn.

303,193–194. SELF-CLOSING HATCHWAY. — Richard D. Thackston, St. Louis, Mo.

303,198. KILN FOR BURNING BRICKS, TILES, ETC. — Garrard Davis Wilgus, Lexington, Ky.

303,213. COMPOUND FOR MAKING BRICKS, ARTIFICIAL STONE, ETC. — Henry A. Cooke, Ocala, Fla.

303,247. INDICATOR FOR ELEVATORS. — Thomas S. Young, New York, N. Y.

SUMMARY OF THE WEEK.

Baltimore.

BUILDING PERMITS. — Since our last report seventeen permits have been granted, the more important of which are the following: —

C. H. Michelman, 3 three-st'y brick buildings, e s Burke St., n of Lancaster St.; and 3 two-st'y brick buildings in rear, fronting w s Port Alley.

Annie Pinning, three-st'y brick building, and two-st'y brick stable, n w cor. Biddle and McKim Sts.

Chas. Roabe, 2 two-st'y brick buildings (square), e s Dallas St., between Chase and Biddle Sts.

Miller & Coleman, 12 two-st'y brick buildings, s w s Bayard St., commencing s e cor. Carroll St.; 16 two-st'y brick buildings, s e s Carroll St., s of Bayard St.; and 17 two-st'y brick buildings, n w s Ward St., s of Bayard St.

Boston.

BUILDING PERMITS. — *Brick.* — *Hammond St.*, Ward 19, for City of Boston, school-house, 32′ x 124′ 4″, three-st'y pitch; Sampson & Clark, builders.

Willard Pl., No. 8, Ware 19, for Joseph Feldman, dwell., 42′ x 47′ 6″, five-st'y flat.

Purchase St., Nos. 99-103, cor. Oliver St., Ward 12, for F. H. Austin's heirs, mercantile, 44′ and 31′ x 44′, five-st'y flat; Robert R. Mayers, builder.

Albany St., near East Concord St., Ward 18, for Mass. Homœopathic Hospital, hospital, 25′ 6″ x 34′, one-st'y pitch; D. Connery & Co., builders.

Newbury St., No. 152, Ward 11, for Albert A. Pope, club-house, 24′ x 90′ 4″, three-st'y flat; Vinal & Dodge, builders.

Purchase St., High St., and Belcher Lane, Ward 12, for John L. Whiting, manufactory, 70′ and 80′ x 95′, six-st'y flat; G. W. Pope, builder.

Wood. — Rockwell St., near Washington St., Ward 24, for R. G. Parker & Co., green-house, 9′ x 130′; potting shed and storage, 16′ x 40′; green-house, 16′ x 60′, one-st'y pitch; R. G. Parker & Co., builders.

Wyoming St., No. 13, Ward 21, for C. E. Rodman, dwell., 16′ x 17′ and 23′ 6″ x 30′ 6″ x 32′, two-st'y pitch.

Lexington St., cor. Prescott St., Ward 1, for Mrs. F. E. Demmick, dwell., 15′ x 35′ and 21′ 6″ x 30′, two-st'y mansard; John C. Frame, builder.

Tremont St., No. 1600, cor. Worthington Pl., Ward 22, for Bernard Dooley, dwell., 24′ x 45′, three-st'y hip; Fred McKenzie, builder.

Unnamed Pl., near Prescott St., Ward 1, for Wilbur Goodwin, 3 dwells., 12′ x 15′ and 20′ x 30′, one-st'y pitch; Wilbur Goodwin, builder.

Meridan St., No. 420, Ward 1, for W. T. Jackson, 21′ 4″ and 29′ 4″ x 45′ 9″, two-st'y mansard; David McPherson, builder.

Danforth St., near Boylston St., Ward 23, for Dougald McDonald, dwell., 15′ x 20′ and 21′ x 30′, three-st'y flat; Dougald McDonald, builder.

East Fourth St., Nos. 592–596, Ward 14, for Lyman Locke, 2 dwells., 15′ x 20′ and 20′ x 40′, three-st'y flat; Lyman Locke, builder.

Bearse Ave., near River View Ave., Ward 24, for Fred'k Gibson, dwell., 24′ x 30′, one-st'y mansard, Fred'k Gibson, builder.

Sunderland St., cor Blue Hill Ave., Ward 21, for Leonidas Murray, dwell , 24′ and 32′ x 36′, two-st'y pitch; J. Philbrick, builder.

Brookside Ave., near Green St., Ward 23, for J. P. Shaw, stable, 36′ x 45′, two-st'y pitch; J. P. Shaw, builder.

Terrace Ave., near Orient Ave., Ward 1, for F. M. Wosgate, dwell., 21′ and 28′ x 30′, two-st'y pitch; Thos. Yeomans, builder.

Saratoga St., Nos. 64–66, Ward 1, for T. C. Powers, 2 dwells., 17′ x 27′ and 21′ x 34′, two-st'y mansard; T. C. Powers, builder.

Brown Ave., cor. Prospect St., Ward 23, for John L. Dakin, dwell., 21′ 6″ and 27′ 6″ x 38′ 6″, three-st'y pitch; W. S. Mitchell, builder.

Porter St., rear, near Bremen St., Ward 2, for F. D. Edmunds, storage, 20′ x 50′, one-st'y pitch; John McCunnic, builder.

Pond St., near May St., Ward 23, for Alfred Bowditch, dwell., 39′ x 45′ and 54′, two-st'y pitch; Sam'l D. Gerry, builder.

Woodbine St., Nos. 46–50, Ward 21, for Nathan P. Ryder, 3 dwells., 20′ 6″ and 26′ 6″ x 32′, two-st'y pitch; J. H. Deluc, builder.

Crescent Ave., opp. Spring Garden St., Ward 24, for Geo. R. Clarke, dwell., 11′ x 14′ and 22′ x 27′, one-st'y mansard; Geo. McCoan, builder.

North Harvard St., near Cambridge St., Ward 25, for Miss S. F. Boynton, 2 dwells., 17′ 6″ x 41′ 6″, two-st'y pitch; W. W. Berry, builder.

Pynchon St., No. 200, Ward 22, for Anthony Hankey, dwell. and store, 25′ x 50′, two-st'y flat, McDonald & Tobin, builders.

Washington St., No. 2698, Ward 21, for Nelson Goodwin, blacksmith shop, 22′ x 28′, one-st'y pitch.

West Third St., No. 203, Ward 13, for John Swanton, dwell., 20′ x 36′, two-st'y flat.

Shepherd St., near Washington St., Ward 25, for John Fay, dwell., 28′ x 32′, two-st'y pitch; Daniel O'Connell, builder.

South St., cor. Jamaica St., Ward 23, for J. J. Williams, dwell., 25′ x 25′ and 42′ x 42′, three-st'y mansard.

Roxbury Ave., near Englewood Ave., Ward 25, for R. L. Woodbury, dwell., 21′ 4″ and 29′ x 33′, two-st'y pitch; Morton & Chesley, builders.

Elm St., near Breed St., Ward 1, for John Casson, dwell., 24′ x 27′, two-st'y flat; M. R. McDonald, builder.

Howard Ave., No. 6, rear, Ward 20, for Albert Fellner, dwell., 18′ x 33′, one-st'y pitch; J. Bass, builder.

Milton Ave., near Prospect St., Ward 24, for Chas. A. Hall, dwell., 2 ′ and 26′ x 28′, two-st'y pitch; J. and F. H. McDonald, builders.

Wise St., near Roys St., Ward 23, for Alexander Freier, stable, 18′ x 24′, one-st'y pitch; Jos. Hammerlee, builder.

Brooklyn.

BUILDING PERMITS. — *Central Ave.*, w s, 25′ n Melrose St., three-st'y brick tenement, tin roof; cost, $4,500; owner, John Biegerman, Central Ave., cor. Melrose St.; architect, J. Platte; builder, F. J. Berlenbach.

South Fifth St., No. 420, three-st'y brick tenement, tin roof; cost, $5,500; owners, Voelbel & Ihrig, South Fourth St., near Ninth St.; architects and builders, C. L. Johnson's Sons.

Sumner Ave., w s, 20′ s Hart St., three houses and one on rear of lot, s s Hart St., 80′ w Sumner Ave., in all 4 two-st'y brown-stone dwells.; cost, each, $5,500; owner, R. F. Clayton, 401 Fourteenth St.; architect, W. F. Clayton.

Manhattan Ave., s e cor. Noble St., 4 four-st'y brick, stone and terra-cotta flats and stores, tin roofs; total cost, $40,000; owner, Jas. Thompson, Far Rockaway, L. I.; builders, Van Riper Bros. and Andrew Hulse.

Eighth Ave., n e cor. Seventeenth St., 4 three-st'y brick tenements, gravel roofs; cost, each, $5,000; owner, W. H. Conklin, 475½ First St.; architect, I. H. Herbert.

President St., s s, 230′ w Third Ave., 5 three-st'y frame tenements, tin roofs; cost, each, $4,500; owner and carpenter, Sampson B. Oulton; architect, Wm. H. Wirth; mason, Anthony McGrath.

Third Ave., w s, 100′ s Third St., one-st'y brick and stone storage warehouse, tin roof; cost, $3,500; owner, Brooklyn Improvement Co., Third Ave., cor. Third St.; architects, Parfitt Bros.; builders, E. P. Crane and D. E. Harris.

Myrtle Ave., n s, 75′ e Charles Pl., three-st'y frame (brick filled) store and tenement, tin roof; cost, $4,600; owner, Mr. Keeps; architect, John Platte; builder, Ernst Loerch.

Sixth Ave., e s, extending from Thirteenth to Fourteenth St., 10 two-st'y brown-stone dwells., tin roofs; cost, each, $4,500; and 2 three-st'y brown-stone stores and flats, tin roofs; cost, each, $6,500; owner, Stillman P. Lincoln, 174 Hall St.; architect and carpenter, Chas. Lincoln; masons, Buchanon & Riley.

Fourteenth St., n s, 80′ 10″ e Sixth Ave., also Thirteenth St., s s, 80′ 10″ Sixth Ave., 2 two-st'y brick dwells., tin roofs; cost, each, $4,000; owner, Stillman P. Lincoln, 174 Hall St.; architect and carpenter, Charles L. Lincoln; masons, Buchanon & Riley.

Powers St., No. 71, n s, 175′ w Lorimer St., three-st'y frame (brick filled) tenement, tin roof; cost, $4,600; owner, S. M. Munn, 71 Powers St.; architects and carpenters, Sammis & Bedford; mason, Michael Keupp.

Park Pl., n s, 250′ w Brooklyn Ave., three-st'y brick dwell., slate roof; cost, $15,000; owner, Edward H. Hobbs, Mansion House; architect, Geo. P. Chappell.

Ninth St., n s, 20′ w Sixth Ave., 2 three-st'y brown-stone dwells., tin roofs; cost, each, $6,000; owner, John Fey, Ninth St., near Sixth Ave.; architect, Francis Ryan.

Boerum St., n s, 125′ e Leonard St., three-st'y brick school-house, tin roof; cost, $57,000; owner, Board of Education; architect, J. W. Naughton; builders, John McQuaid and R. B. Ferguson.

Degraw St., s s, 100′ w Smith St., three-st'y brick school-house, tin roof, wooden cornice; cost, $38,600; owner, Board of Education; architect, J. W. Naughton; builders, Frank Kelly and John S. McRea.

Berkeley Pl., n s, 350′ w Sixth Ave., three-st'y brick school-house, tin roof; cost, $48,000; owner and architect, same as last; builders, John H. O'Rourke and John S. McRea.

Nelson St., s s, 140′ e Clinton St., 2 three-st'y brick tenements, tin roofs; cost, each, $4,500; owner, Edward Keogh, Jr., 146 Luquer St.; builder, Thomas Keogh.

Washington Park, No. 171, e s, 120′ n Willoughby Ave., three-and-a-half-st'y brick dwell., tin and slate roof; cost, $12,500; owner, Wm. N. Dykman, Montague St., near Clinton St.; architect, Mercein Thomas; builders, P. J. Carlin and J. S. McRea.

Greene Ave., s s, 160′ e Throop Ave., 2 three-st'y brick and brown-stone dwells., tin roofs; cost, each, $6,500; owner, Paul C. Grening, 420 Gates Ave.

Clifton Pl., n s, 375′ e Grand Ave., two-st'y brick stable, felt and gravel roof; cost, $7,000; owner, R. R. Bennett, 79 Madison St.; architect and builder, J. N. Smith.

Clifton Pl., s s, 100′ e Clason Ave., two-st'y brick dwell. and stable, tin roof; cost, $5,000; owner, A. J. Pauch, 315 Greene Ave.; architects, Eastman & Daws; builders, P. J. Carlin and Long & Barnes.

Garfield Pl., s s, 260′ w Fifth Ave., three-st'y brick tenement, tin roof; cost, about $4,000; owner, Thos. Dowd, Macomb St.; architect and builder, Thos. J. Nash.

Douglass St., n s, 250′ w Bond St., 2 three-st'y brick tenements, gravel and felt roofs; cost, each, $4,900; owner, John M. O'Neil; architect and builder, John S. O'Neil.

Madison St., s s, 170′ w Ralph Ave., 4 three-st'y frame (brick filled) flats, tin roofs; cost, each, $3,500; owner, W. J. Caufield, New York City; architect, I. D. Reynolds.

Gates Ave., s s, 225′ e Clason Ave., three-st'y free-stone dwell., slate and tin roof; cost, $14,000; owner, Miguel Alvers; architect, Amzi Hill; builder, Benjamin Linikin.

Hart St., n s, 100′ e Nostrand Ave., 5 buildings; also, *Hart St.*, n s, 138′ w Marcy Ave., 5 buildings, in all 10 two-and-a-half-st'y and basement brown-stone dwells., tin roofs; cost, each, $6,000; owner, F. R. Boerum; architect, I. D. Reynolds; builder, Thos. E. Greenland.

Myrtle Ave., Nos. 1154 *and* 1156, s s, 250′ e Broadway, 2 three-st'y frame tenements; cost, each, $4,200; owner, Salomon Wolf; architect, Th. Engelhardt; builder, Jos. Wagner, Jr.

Herbert St., No. 54, s s, 150′ e Humboldt St., three-st'y frame tenement, tin roof; cost, $4,000; owner, Sarah M. E. Hall, 122 Mott St., New York; architect, A. Herbert; builder, Daniel O'Keeffe.

Flushing Ave., No. 837, n s, 25′ e Morrell St., three-st'y frame store and tenement, tin roof; cost, $4,500; owner and builder, Chas. Lehmann, Goerck St., New York; architect, Th. Engelhardt.

Remsen St., s w cor. Clinton St., five-st'y brick and stone club-house, tin roof; cost, about $90,000; owner, Hamilton Club, Brooklyn; architect, Geo. B. Post; builder, D. H. King, Jr.

Broadway, e s, 60′ s Kosciusko St., 2 three-st'y brick tenements, tin roofs; total cost, $9,000; owner, Mary J. Hutchthouse, Grove St.; architect and carpenter, George A. Bohannon; mason, J. Lambert.

Garfield Pl., s s, 50′ e Seventh Ave., 2 three-st'y brown-stone dwells., tin roofs; cost, each, $9,000; owners, architects and builders, Martin & Lee, 440 Clermont Ave.

Manhattan Ave., w s, 25′ n Norman Ave., 3 three-st'y brick stores and dwells., tin roofs; cost, each, $5,000; owner, Adrian Meserole, Lorimer St.; architect, F. Weber; builders, Smith & Gately and S. Randall.

ALTERATIONS. — *Clinton St., Nos.* 12 *and* 14, add one-st'y, also three-st'y brick extension, tin roof; also front altered; cost, $8,000; owner, A. Hardenbergh, cor. Clinton and Fulton Sts.; architects, Eastman & Daws; builder, not selected.

Greene Ave., s e cor. Clermont Ave., add to tower, also one-st'y terra-cotta and brick extension; cost, $15,000; owner, Church of the Messiah; architect, R. H. Robertson; builders, Terence Kiernan and Jeans & Taylor.

Adelphi St., e s, 100′ n Myrtle Ave., four-st'y brick extension, tin roof; cost, $10,000; owner, Board of Education, Red Hook Lane; architect, J. W. Naughton; builder, F. D. Norris.

Heyward St., s s, 71′ 4″ w Broadway, three-st'y brick extension, slate roof, also rear wall rebuilt; cost, $15,000; owner, Board of Education, Red Hook Lane; architect, J. W. Naughton; builder, John McQuaid.

Seventeenth St., n s, 100′ e Seventh Ave., two-st'y brick extension, tin roof; cost, $14,000; owner, Board of Education; architect, J. W. Naughton; builder, F. D. Norris.

McKibben St., n s, 150′ e Ewen St., three-st'y brick extension, tin roof, also interior alterations, etc.; cost, $19,000; owner, Board of Education; architect, J. W. Naughton; builder, P. F. O'Brien.

The Academy of Music is to be redecorated by Mr. W. H. Day, of New York, under directions of Messrs. Kimball & Wisedell, who have also designed some interior alterations to the Academy.

Chicago.

BUILDING PERMITS. — N. Eek, two-st'y addition, 146 Oak St.; cost, $3,000; builder, J. A. Modin.

A. Schwarz, one-st'y addition, 152 Illinois St.; cost, $3,000.

J. Mayer, two-st'y store and flats, 134 West Eighteenth St.; cost, $3,500.

G. N. Hall, 2 two-st'y flats, 1148-50 West Harrison St.; cost, $5,000; builder, W. Kerr.

A. Doering, two-st'y dwell., 894 Monroe St.; cost, $7,000; architect, J. M. Van Osdel & Co.; builders, Fox & Hinds.

B. J. Kenneally, three-st'y store and dwell., 1197 Blue Island Ave.; cost, $5,600.

Dickey Bros., two-st'y barn, Sherman Pl.; cost, $3,500.

T. C. Octigon, three-st'y flats, 11 Twenty-sixth St.; cost, $5,000.

J. Noonon, two-st'y dwell., 789 Clybourne Ave.; cost, $3,000.

E. Jacobs, two-st'y dwell., 20 Kemper Pl.; cost, $4,000.

Dr. P. H. McElroy, two-st'y store and dwell., 528 West Indiana St.; cost, $9,000; architect, W. H. Drake; builder, J. O'Connell.

Mrs. S. Turner, three-st'y store and flats, 221 Blue Island Ave., cost, $6,000; architect, A. Bessler, builder, R. Tobin.

G. M. Thoesell, three-st'y store and dwell., 70 Chicago Ave.; cost, $8,000; architect, J. Otter; builder, C. Landstrom.

N. Davis, three-st'y store and dwell., 33 Chicago Ave.; cost, $8,000; architect, H. Rehwoldt.

J. Tobey, three-st'y dwell., 204 Centre Ave.; cost, $6,500.

W. H. Jung, three-st'y flats, 328 North Market St., cost, $6,500; architect, J. H. Huber.

McCormick Estate, additional, 185-189 Kinzie St.; cost, $3,000.

J. Schultz, two-st'y flats, 40 Bradley St.; cost, $3,400.

J. Vanis, two-st'y dwell., 641 Centre Ave.; cost, $3,700.

J. Kownorsky, two-st'y dwell., 290 West Twentieth St.; cost, $3,700.

C. Jorn, 2 three-st'y stores and dwells., Twenty-sixth St.; cost, $10,000.

J. McKinney, three-st'y flats, 319 West Jackson St.; cost, $5,000.

H. Wheeler, two-st'y barn, 2962 Michigan Ave.; cost, $5,000.

J. Madey, two-st'y dwell., 677 Dixon St.; cost, $2,700.

J. Krohn, three-st'y store and dwell., 457 West Chicago Ave.; cost, $8,000; architect, H. T. Kley.

J. Franks, three-st'y stores and dwell., 242 South Halsted St.; cost, $18,000.

Mrs. J. Bender, two-st'y dwell., 608 Twenty-first St.; cost, $3,800.

W. H. Morehouse, two-st'y dwell., 3741 Grand Boulevard; cost, $20,000.

E. T. Ewing, two-st'y store and dwell., 1082 Twelfth St.; cost, $4,000; architects, Treat & Foltz.

H. Looi, two-st'y store and dwell., 714-716 Lake St.; cost, $8,000; architect, H. R. Wilson; builders, Rogers & Cook.

W. P. Dyer, two-st'y dwell., 294 Loomis St.; cost, $6,500; architects, Furst & Rudolph.

J. Morh & Son, boiler shop, 32-42 Illinois St.; cost, $15,000; builders, J. N. Dunphy & Co.

Mrs. C. Dieden, three-st'y flats, 332 Wells St.; cost, $12,000; architect, T. Karls; builder, A. Replinger.

W. Johnson, three-st'y store and flats, 486-488 West Chicago Ave.; cost, $5,000; architect, F. Wolf; builders, Eich & Ott.

New York.

STRIKE. — The continuance of the bricklayers' strike has a very depressing influence on new work, and several improvements have been abandoned for this year.

SKATING-RINKS. — The plans for the Elite Roller Skating-Rink, 200′ x 275′, have been completed by Messrs. McElfatrick, Son & De Band. The building is to be three stories high, of brick and brown-stone, and will cost about $150,000.

On the s s of One Hundred and Twenty-fifth St., between Lexington and Third Aves., Mr. Wm. A. Martin will also build a rink, to cost $15,000.

BUILDING PERMITS. — *Twelfth St.*, s w cor. West St., running through to Bethune St., 4 five-st'y brick storehouses, gravel roofs; cost, each, $28,000; owner, John T. Johnson, 8 Fifth Ave.; architects, Renwick, Aspinwall & Russell; builders, Moran & Armstrong.

Avenue A, Nos. 1026 *and* 1028, 2 four-st'y brick tenements, tin roofs; cost, each, $10,000; owner, Thomas Fitzgerald; architects, A. B. Ogden & Son.

One Hundred and Fifth St., s s, 275′ w Tenth Ave., four-st'y tenement, tin roof; cost, $16,000; owner and architect, Wm. R. Powers, 508 West Fiftieth St.

Fifty-fifth St., Nos. 110-116, s s, 150′ w Sixth Ave., 6 four-st'y brick and brown-stone dwells., mansard fire-proof roofs; cost, each, $15,000; owner, A. H. Barney, 101 East Thirty-eighth St.; architect, J. B. Lord; builders, L. N. Crow, and F. C. Miller.

West Broadway, No. 127, being 112′ 6″ n White St., six-st'y brick warehouse, tin roof; cost, $19,000; owner, Simon Morris, 126 East One Hundred and Seventh St.; architect, A. Zucker.

Sixty-second St., n s, 75′ e Third Ave., five-st'y brick store and tenement, tin roof; cost, $9,000; owner, John L. Schofield, West Farms, N. Y.; architect, A. Spence.

One Hundred and Fifteenth St., n s, 100′ w Pleasant Ave., two-st'y brick and stone church, cement and gravel roof; cost, $75,000; owner, Rev. Emilieu Kirner, Pastor, Madison Ave., s w cor. Fifty-first St.; architect, L. J. O'Connor.

Morris Ave., w s, 53′ n One Hundred and Forty-eighth St., three-st'y frame dwell., and a one-st'y frame stable, tin roofs; cost, $3,000; owner, Carl Huelster, Morris Ave. and One Hundred and Forty-eighth St.; architect, Adolph Pfeiffer.

Division St., No. 170, five-st'y brick tenement, tin roof; cost, $16,500; owner, Geo. H. Benner, 55 East Third St.; architect, Adam Munch.

Division St., No. 174, six-st'y brick tenement, tin roof; cost, $13,000; owners, Sobel Bros., 160 Greenwich St.; architect, Henry Dudley.

East Tenth St., Nos. 469 *and* 471, one-st'y brick boiler-house, gravel roof; cost, $3,500; owner and builder, Wm. E. Uptegrove, 596 Greene St.; architects and masons, Berton & Nickel.

One Hundred and Thirteenth St., n w cor. First Ave., 5 five-st'y brick tenements and stores, tin roofs; total cost, $70,000; owner, Matthew Coogan, 422 East One Hundred and Fifteenth St.; architects, Cleverdon & Putzel.

West Tenth St., No. 55, four-st'y brick dwell., tin roof; cost, $12,000; owner, John Taylor Johnston, 8 Fifth Ave.; architects, Renwick, Aspenwall & Russell.

Courtland Ave., e s, 47′ n One Hundred and Fifty-fourth St., two-st'y brick carriage-house, tin roof; cost, $4,600; owner, Adam Moebus, 709 East One Hundred and Fifty-fourth St.; architect, Henry Piering.

ALTERATIONS.—*Sixth Ave.*, n e cor. Twenty-third St., repair damage by fire; cost, abt. $40,000; owner, Board of Trustees in charge by F. Clarkson, President, 48 East Sixty-sixth St.; architect, R. F. Hatfield; builders, W. A. & F. E. Conover, and J. C. Wessels.

East Forty-second St., Nos. 213-221, west end altered for office and show room, front altered, etc.; cost, $5,000; owner, John N. Stearns, 10 West Fifty-eighth St.; architect, F. C. Merry; builders, J. T. Kennedy, and L. H. Williams.

West Forty-ninth St., No. 61, two-st'y brick extension, tin roof; cost, $5,000; owner, Agnes Neustadt, on premises; architects, Schwarzmann & Buchman.

Sixtieth St., s s, 84′ w Broadway, add one st'y; cost, $3,500; owner, B. Laurence, 41 East Thirty-third St.; architect, L. J. O'Connor.

Delancy St., s e cor. Cannon St., one-st'y brick extension, tin roof, interior alterations; cost, $3,500; owner, Martin Heldt, 179 East Houston St.; architect, J. Boekell.

East Fourth St., Nos. 339-343, one-st'y brick extension, interior alterations for offices in first story, etc.; cost, abt. $7,000; owner, Morris S. Thompson, 250 West Forty-fifth St.; architect, W. Howe; builder, E. D. Garnsey.

West Twenty-seventh St., No. 130, six-st'y brick extension, interior alterations, etc.; cost, $12,000; owner, Sarah A. Sanchez, 50 West Twenty-eighth St.; architect, M. C. Merritt.

West Fifty-seventh St., Nos. 518 *and* 520, raise one st'y; cost, $10,000; owner, Conrad Stein, 521 West Fifty-seventh St.; architect, Julius Kastner.

Lexington Ave., w s, from Forty-first to Forty-second St., internal alterations; cost, $3,500; owner, Manhattan Storage and Warehouse Co., on premises; architect, James E. Ware.

Railroad Ave., w s, 500′ n One Hundred and Thirty-eighth St., four-st'y brick extension, tin roof; cost, $4,000; owner, David Rousseau, 310 Mott Ave.; architects and builders, John C. Donnelly's Sons.

East Twenty-fifth St., No. 116, raise one story; cost, $5,000; owner and builder, John Smith, 114 East Twenty-fifth St.

Philadelphia.

BUILDING-PERMITS. — *Fifteenth St.*, s of Federal St., three-st'y dwell., 18′ x 50′; Jas. E. Miller, owner.

Point Breeze, 4 two-st'y oil-works buildings, 25′ x 35′, 43′ x 97′, and 90′ x 90′; Atlantic Refining Co., owners.

Nice Ave., near Blue Bell Hill, two-st'y dwell., 22′ x 29′; Thos. Evans, owner.

Belview St., bet. Twenty-first and Twenty-second Sts., two-st'y dwell., 26′ x 30′; J. S. Tomlinson, contractor.

Mansion St., s of Jefferson St., three-st'y dwell., 17′ x 45′; C. J. Wallace, contractor.

Reed St., bet. Barlow and Manley Sts., 6 three-st'y dwells., 16′ 4″ x 37′; A. M. Green, owner.

Eighth St., bet. McKean and Dudley Sts., 8 two-st'y dwells., 16′ x 32′; J. C. D. Smith, owner.

Fifth St., w of Orkney St., 4 three-st'y dwells., 15′ x 44′; Mark Devlin, owner.

Market St., No. 1027, six-st'y store, 26′ x 200′; Jacob Myers, contractor.

Allegheny Ave., w of Frankford Road, two-st'y house, 20′ x 58′; Wm. Johnson, owner.

Lehigh Ave., n s, Somerset St., s s, Eighth St, w s, and on a new street not yet named, w from Eighth St., 48 two-st'y dwells., and 12 three-st'y dwells., 16′ 5″ x 57′ 6″ and 43′ 9″; S. Horner, Jr., owner.

Sedgeley Ave., w of Thirtieth St., two-st'y dwell., 20′ x 48′; Jno. Howden, contractor.

Franklin St., above Cumberland St., 7 two-st'y dwells., 14′ x 42′; Amos D. Kennedy, owner.

Second St., n of Cambria St., two-st'y stable, 16′ x 31′; Amos H. Hall, contractor.

Jasper St., n of Somerset St., two-st'y dwell., 16′ x 40′; Duryea & Childs, contractors.

Neff St., cor. Mercer St., 23 two-st'y dwells., 14′ x 28′ and 15′ x 40′; Chas. Judge, owner.

Main St., No. 4610, three-st'y dwell., 15′ x 32′; A. H. Taylor, contractor.

Wayne St., cor. Berkley St., two-st'y dwell., 18′ x 40′; Samuel Clawson.

Lancaster Ave., Nos. 3515 *and* 3517, 2 three-st'y dwells., 20′ x 55′; F. Arnold, owner.

Broad St., s of Dickinson St., 8 three-st'y dwells., 16′ x 50′; W. R. Matchett, owner.

Thirteenth St., between Morris and Tasker Sts., 21 three-st'y dwells., 16′ x 50′; W. R. Matchett, owner.

Fourth St., cor. Willow St., four-st'y factory, 16′ 6″ x 30′; B. P. Evans, contractor.

Clay St., between Frelinghuysen and Centre Sts., 2 two-st'y dwells., 17′ x 32′; S. S. Keely, owner.

Christian St., w of Miller St., 2 two-st'y dwells., 16′ x 28′; Jas. Dooke, owner.

York St., n of Angle St., 2 two-st'y dwells., 15′ x 40′; Benj. Walker, contractor.

St. Louis.

BUILDING PERMITS. — Seventy-one permits have been issued since our last report, nineteen of which are for unimportant frame houses. Of the rest, those worth $2,500 and over are as follows: —

Ferd. Hosmer, two-st'y brick dwell.; cost, $4,500; A. Beimke, architect; sub-let.

Mrs. Lipphart, 2 adjacent two-st'y tenements; cost, $4,700; A. Whri, contractor.

Heymann Eppstein, one-st'y brick dwell.; cost, $2,500; F. Voepel, contractor.

St. Louis Mutual House Building Co., two-st'y brick dwell.; cost, $3,000; Ed. Mortimer, architect; J. H. Dunlap, contractor.

Jno. J. Ganahl Lumber Co., interior alteration to Union Capitol Hall; cost, $2,500; G. Neumister, contractor.

Dr. W. C. Richardson, two-st'y brick tenement-house; cost, $5,000; E. Reed, contractor.

J. B. Giancil, two-st'y brick dwell.; cost, $2,500; J. E. Truitt, contractor.

Farer Shindler, one-st'y brick hall; cost, $4,500; H. Wanschaffe, contractor.

Huetteman Bros., one-st'y soap factory; cost, $2,800; W. Hemingtons, contractor.

E. Schulte, 2 adjacent dwells.; cost, $8,500; Alphen & Pranel, contractor.

Washington, D. C.

Mass. Ave., intersection Sixth and C Sts., n e, 2 three-st'y brick dwells., for Chas. White; cost, $12,000; Jas. H. McGill, architect.

K St., bet. North Capitol and First Sts., n w, two-st'y brick dwell., for Jno. Newman; cost, $3,200; Peter McCartney, builder.

Seventh St., bet. D and E Sts., n w, four-st'y brick store for Jno. L. Vogt; cost, $9,000; Cluss & Shultz, architects; Henry Conrades.

North Capitol St., cor. P St., n w, two-st'y brick dwell., for W. H. Mohler; cost $3,500.

N St., bet. Thirty-first and Thirty-second Sts., n w, two-st'y brick dwell., for M. Plater; cost, $7,000; Frey Bros., builders.

T St., bet. Thirteenth and Fourteenth Sts., n w, 2 three-st'y brick dwells., for Geo. W. Cochran; cost, $9,400; W. C. Morrison, builder.

Vt. Ave., near Iowa Circle; three-st'y brick dwell., for Wm. B. Morgan; cost, $12,000; W. C. Morrison, builder; Robt. Stead.

Sixteenth St., cor. H St., n w, three-st'y brick dwell., for Henry Adams; cost, $35,000; H. H. Richardson, architect; Chas. Edmonston, builder.

Sixteenth St., cor. H St., n w, three-st'y brick dwell., for John Hay; cost, $70,000; H. H. Richardson, architect; Chas. Edmonston, builder.

Q St., bet. Twentieth and Twenty-first Sts., n w, three-st'y brick dwell., for Mrs. Sarah J. Foster; cost, $7,000; T. F. Schneider; architect; C. C. Martin, builder.

K St., bet. Ninth and Tenth Sts., n w, two-st'y brick dwell., for Geo. T. Dearing; cost, $3,000.

N St., bet. Nineteenth and Twentieth Sts., n w, three-st'y brick dwell., for B. F. Tilley; cost, $6,000; J. G. Myers, architect; A. G. Stevens, builder.

Fifteenth St., bet. P and Q Sts., n w, two-st'y brick dwell., for Mrs. J. A. Powell; cost, $4,300; R. W. Darby, builder.

PROPOSALS.

CEMENT, LUMBER, ETC.

[At Rock Island, Ill.]

ROCK ISLAND ARSENAL, July 28, 1884.

Sealed proposals are invited to furnish, delivered on cars or wagons at the arsenal, the lime, hydraulic cement, coke, coal (bituminous, anthracite and blacksmith) and lumber that may be required at this arsenal from date of contract to June 30, 1885.

Bills of the materials with approximate quantities, specifications as to the quality, and other requirements can be obtained from the undersigned.

The successful bidder will be required to enter into contract and give good and sufficient bond for the faithful performance of the same.

Bids for bituminous coal delivered on cars in the city of Rock Island will be considered.

The Government reserves the right to reject any or all bids.

The quantities of material required can be given only approximately, and after contracts are awarded only such materials will be furnished as may be required and are ordered from time to time by the commanding officer of the arsenal.

Proposals should be in triplicate, sealed and indorsed "Proposals for Materials."

Bids will be opened at 10 A. M., **September 2, 1884.**

Bidders are invited to be present at the opening.

D. W. FLAGLER,
452 Lieut.-Col. of Ordnance Commanding.

IRON BEAMS.

[At Rock Island, Ill.]

ROCK ISLAND ARSENAL, July 26, 1884.

Sealed proposals, to be opened at **10 A. M., August 30, 1884,** are invited to furnish for this arsenal about 500,000 pounds of wrought-iron beams, tees, and angles.

Full bills and specifications can be obtained from the undersigned.

The Government reserves the right to reject all bids not deemed satisfactory.

Bids from manufacturers who have not already made successfully the sizes of beams required will not be considered.

The successful bidder must enter into contract and give satisfactory bonds for the faithful performance of the same.

D. W. FLAGLER,
452 Lieut.-Col. of Ordnance Commanding.

HYDRAULIC ELEVATOR.

[At Washington, D. C.]

GOVERNMENT BUILDING, CORNER SEVENTEENTH AND F STREETS,
WASHINGTON, D. C., August 7, 1884.

Sealed proposals for furnishing and putting in place in this building a hydraulic passenger elevator, of high speed and of the long cylinder type, will be received **at this office until 12 M., on August 25, 1884,** and opened immediately thereafter in presence of bidders.

The proposed locality of the elevator and general plan and specifications for its construction may be seen, and blank forms of proposals obtained, on application at Room 26 of the building.

Proposals should be endorsed "Proposals for Elevator" and addressed to the undersigned.

The right to reject any bid not deemed to be for the best interest of the United States is reserved.

451 JAS. EVELETH, Superintendent.

Publishers' Department.

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New Advertisements.

A. COX STOVE CO. (Philadelphia, Pa.), Heating Apparatus. Page vii.
AMERICAN INSTITUTE. (New York, N. Y.), Exhibition. Page xiv.
PAGE STEAM HEATING CO. (Norwich, Conn.), Heating Apparatus. Page iv.
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WANTED.

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WANTED.

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ASSISTANT. Wanted, assistant immediately, a thoroughly qualified assistant and draughtsman, in the design and details of general architectural work. State salary, must have good reference. Jas. Stillburg, Architect, 29 Fifth Ave., Pittsburg, Pa. 451

PROPOSALS.

LABOR AND MATERIALS. [At Jackson, Tenn.]

OFFICE OF SUPERVISING ARCHITECT, TREASURY DEPARTMENT, WASHINGTON, D. C., August 12, 1884.

Sealed proposals will be received at this office until **2 P. M., on the 9th day of September, 1884,** for furnishing all the labor and materials, stone, bricks, terra-cotta, wood-joists, roof framing, slate covering, etc., required for the basement and superstructure of the court-house and post-office building at Jackson, Tenn., in accordance with drawings and specification, copies of which and any additional information may be obtained on application at this office, or the office of the local superintendent of the building.

Bids must be accompanied by a certified check, and those received after the time of opening will not be considered.

M. E. BELL, Supervising Architect.

452

PIER. [At Calumet Harbor, Ill.]

U. S. ENGINEER OFFICE, 25 HONORE BUILDING, CHICAGO, ILL., July 24, 1884.

Sealed proposals, in triplicate, will be received at this office **until 12 o'clock, noon, Saturday, August 30, 1884,** for improving Calumet Harbor, Ill., for extension of south pier about 200 linear feet.

For specifications, blanks for proposals, and all information apply at this office.

W. H. H. BENYAURD, Major of Engineers, U. S. A.

452

BREAKWATER AND PIER. [At Milwaukee, Racine and Kenosha, Wis.]

UNITED STATES ENGINEER OFFICE, 366 MILWAUKEE STREET, MILWAUKEE, WIS., July 29, 1884.

Sealed proposals, in triplicate, will be received at this office **until 12 o'clock, noon, August 29, 1884,** and opened immediately thereafter in presence of bidders for the following harbor improvements, viz.:

Harbor of Refuge, Milwaukee Bay: construction of breakwater.

Racine Harbor: superstructure over 340 feet more or less of north pier and repairs of pier.

Kenosha Harbor: superstructure over 355 feet more or less of south pier and repairs of pier.

Proposals will be accompanied by a guaranty that if the bid be accepted, contract will be entered into within ten days after notice of acceptance.

For blank proposals and information apply at this office.

The United States reserves the right to reject any or all bids.

Proposals will be indorsed on the envelope: "Proposals for Harbor of Refuge, Milwaukee Bay," (or Racine or Kenosha Harbor) and addressed to

CAPTAIN W. L. MARSHALL, Corps of Engineers, U. S. A.

452

STONE. [Near Wilmington, N. C.]

U. S. ENGINEER OFFICE, 70 SARATOGA STREET, BALTIMORE, MD., July 24, 1884.

Proposals for furnishing 30,000 tons of stone for the improvements of the Cape Fear River, North Carolina will be received **until noon of August 28, 1884,** and opened immediately thereafter.

Blank forms and specifications, etc., can be had upon application to this office, or to the resident engineer, Mr. Henry Bacon, at Wilmington, N. C.

WM. P. CRAIGHILL, Lt.-Col. of Engineers, U. S. A.

451

STATE CAPITOL. [At Atlanta, Ga.]

New sealed proposals for the Georgia State Capitol Building are invited by the Capitol Commission **until September 24, 4 P. M. 1884.**

Plans, specifications, schedules and instruction to bidders may be had upon application to the Commission, in Atlanta, Ga., or to Edbrooke & Burnham, architects, 184 Dearborn St., Chicago, Ill.

Proposals may be submitted for the entire work, or for any classified portion, also for materials.

The Commission reserves the right to accept any bid, or to reject the whole.

No proposals will be considered unless made out on the schedules blanks.

All bidders will be required to furnish bond and security or a certified check (payable to the Chairman of the Board) equal in amount to five per cent of the bid submitted, as a guarantee to enter into contract with the Board should his bid be accepted.

Bids must be sealed and indorsed "Proposals for State Capitol Building," and addressed to the Board of Capitol Commissioners, Atlanta, Ga.

HENRY McDANIEL, Governor, and Ex-Off. Ch'n Commission.

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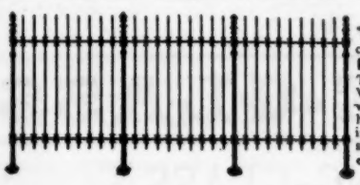

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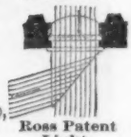

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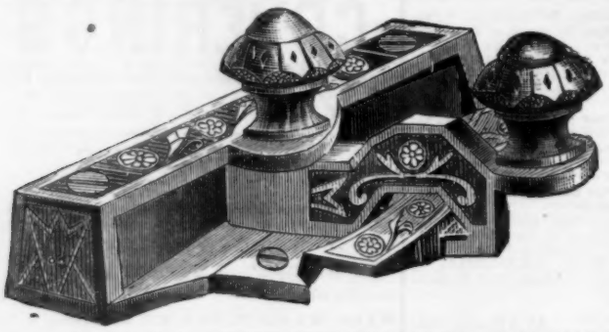

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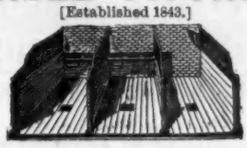

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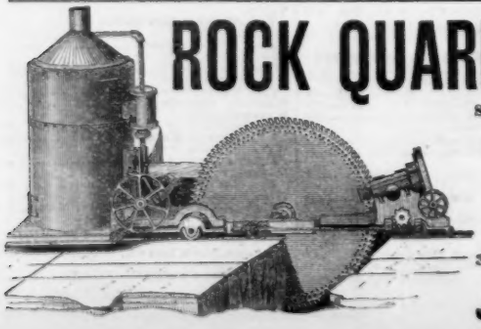

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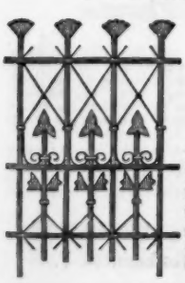

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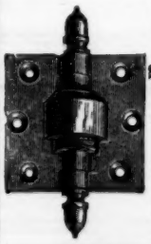

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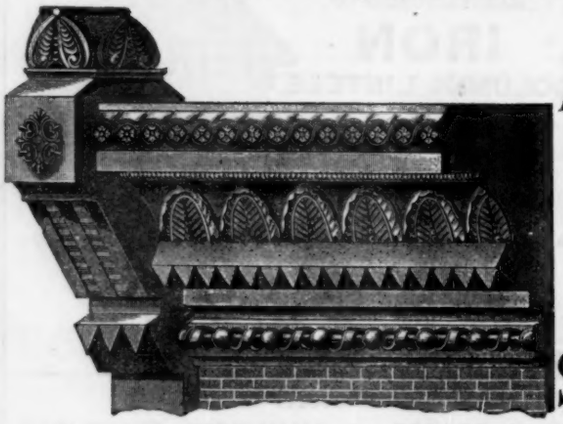
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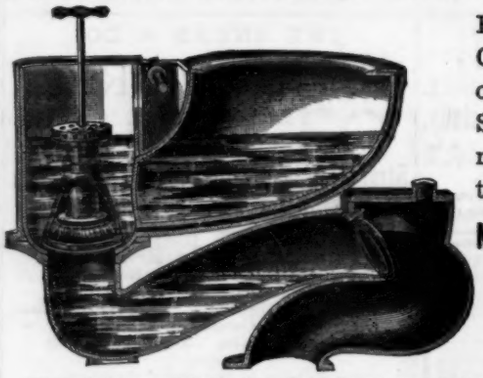
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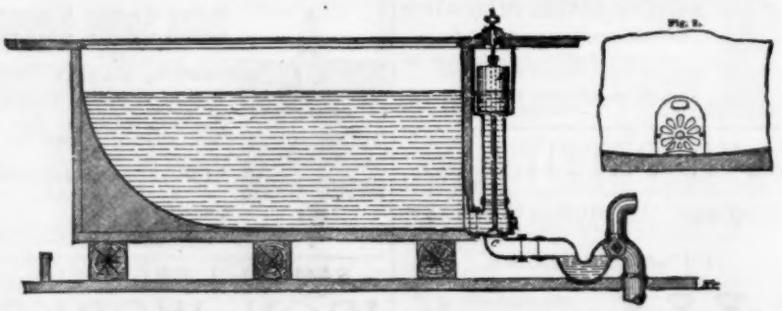
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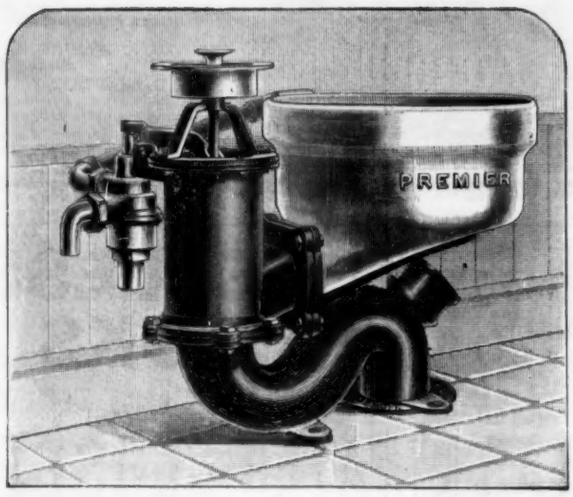

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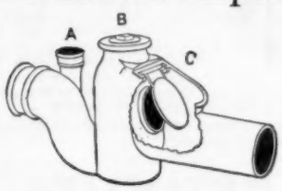

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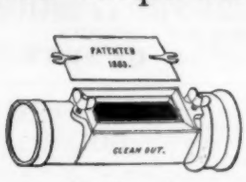

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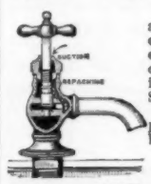

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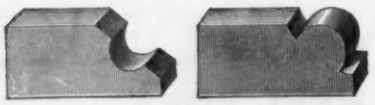

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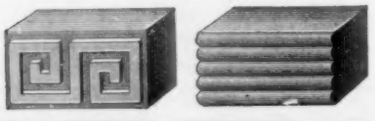

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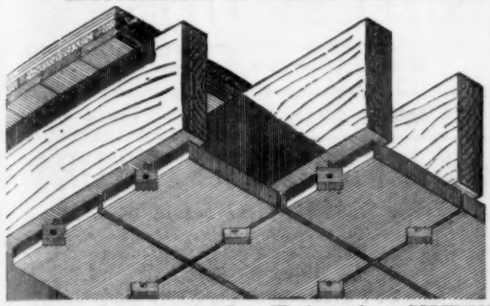

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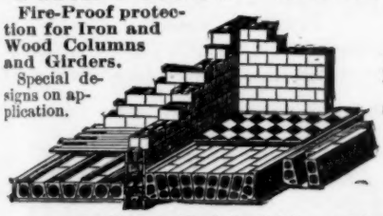

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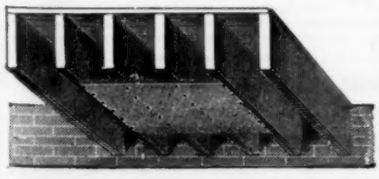

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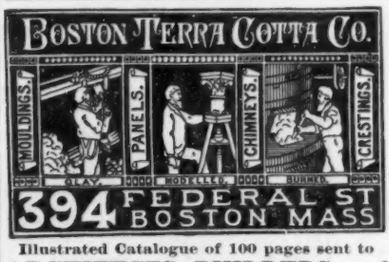

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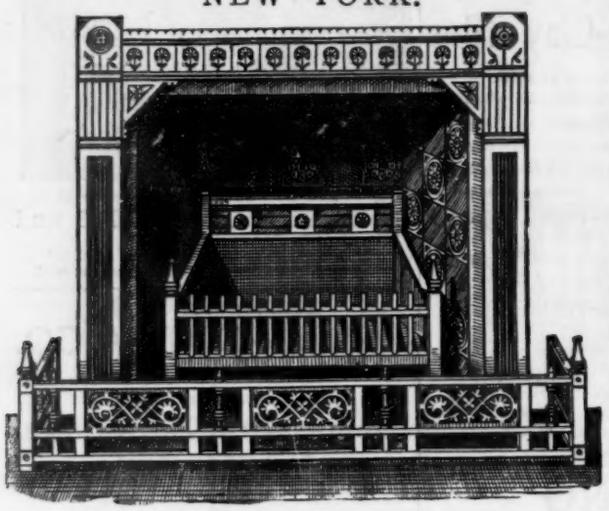

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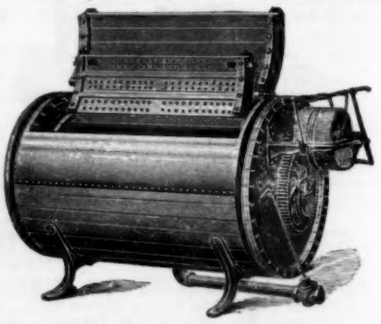

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